



***PRIUS***

***Gasoline-Electric Hybrid***

***Emergency Response Guide  
(Revised)***



## Foreword

This guide was developed to educate and assist emergency responders in the safe handling of the Toyota Prius gasoline-electric hybrid vehicle following an incident. Prius emergency response procedures are similar to other Toyota vehicles with the exception of the high voltage electrical system. It is important to recognize and understand the high voltage electrical system features and specifications of the Toyota Prius as they may not be familiar to emergency responders.

High voltage electricity powers an electric motor, generator, and inverter. All other conventional automotive electrical devices such as the headlights, radio, and gauges are powered from a separate 12-Volt battery. Numerous safeguards have been designed into the Prius to help ensure the high voltage, approximately 274-Volt, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack is kept safe and secure in an accident.

The NiMH HV battery pack contains sealed batteries that are similar to rechargeable batteries used in laptop computers, cell phones, 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. These cables are routed underneath and inboard the floor pan reinforcement which would not normally be accessed by emergency responders at the scene of an accident.

Additional topics contained in the guide include:

- Toyota Prius identification.
- Major hybrid component locations and descriptions.
- Extrication, fire, recovery, and other emergency response information.
- Roadside assistance information.

By following the information in this guide, emergency responders will be able to handle the Prius hybrid-electric vehicle as safely as the emergency response of a conventional gasoline engine automobile.

**Note:**

*This **Prius Emergency Response Guide (Revised)** supercedes the earlier **Prius Emergency Response Guide** published by Toyota Motor Corporation in 2000 (Publication No OTH020U)*

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## About the Prius

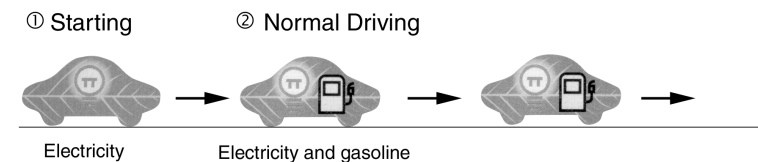
The Toyota Prius is a gasoline-electric hybrid vehicle sold in North America since May 2000. Gasoline-electric hybrid means the vehicle contains a gasoline engine and an electric motor for power. Two energy sources are stored on board the vehicle:

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.

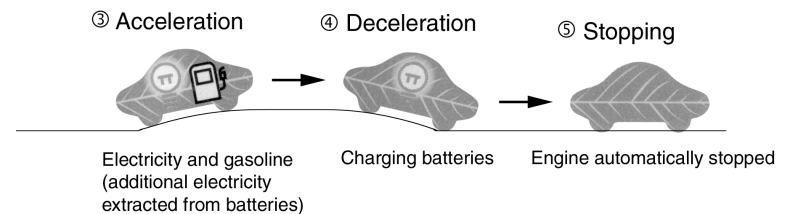
The result of combining these two power sources is increased fuel economy and reduced emissions. The gasoline engine also powers an electric generator to recharge the battery pack; so, unlike a pure all electric vehicle, the Prius never needs to be recharged from an external electric power source.

Depending on the driving conditions one or both sources are used to power the vehicle. The following illustrations demonstrate how the Prius operates in various driving modes.

- ① On 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 is also used to recharge the battery pack.



- 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 braking, the vehicle regenerates the 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 motor are off, however the vehicle remains on and operational.



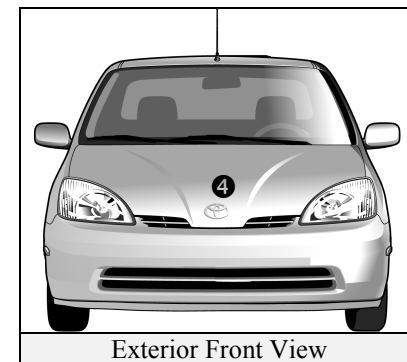
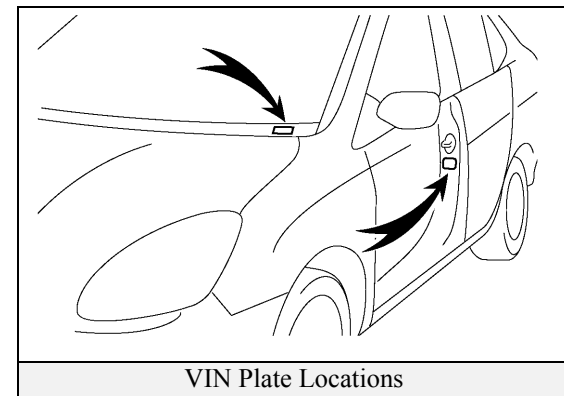
## Prius Identification

In appearance, the Prius is similar to a compact 4-door sedan. Exterior, interior, and engine compartment illustrations are provided to assist in identification.

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

Example VIN: JT2BK12U810020208

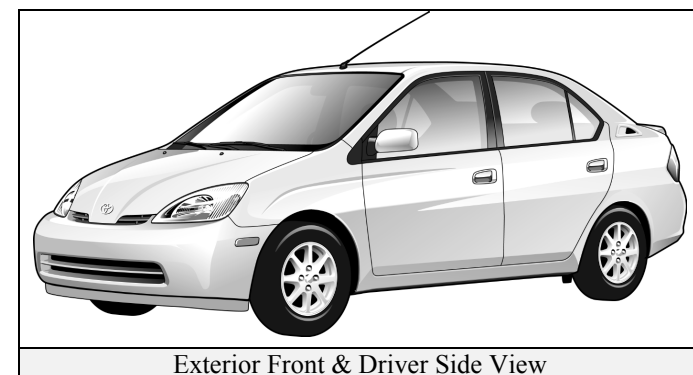
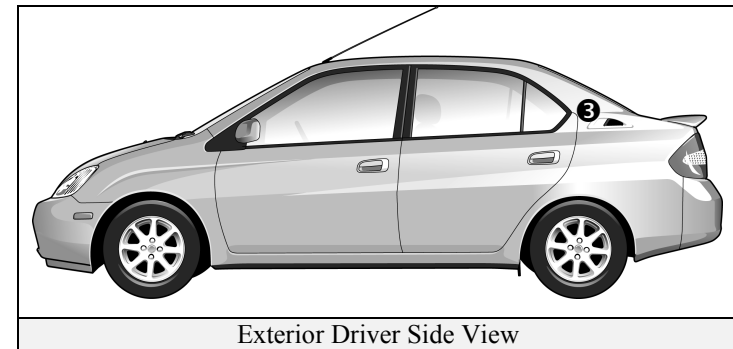
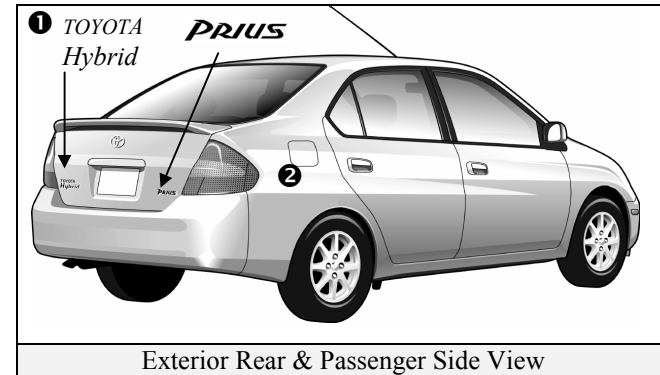
(A Prius is identified by the first 6 alphanumeric characters **JT2BK1**)





Exterior

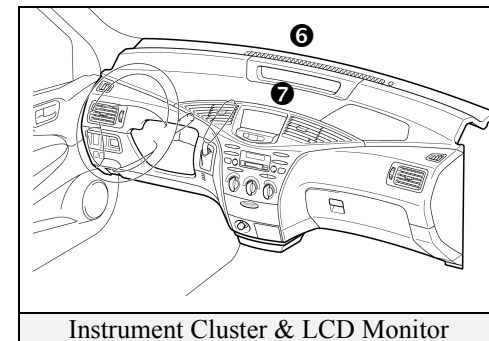
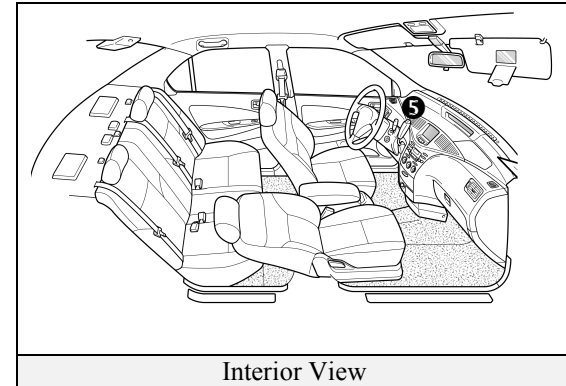
- ❶ *TOYOTA Hybrid & PRIUS* logos on trunk.
- ❷ Gasoline fuel filler door located on passenger side quarter panel.
- ❸ HV battery pack air vent on the driver side C-pillar.
- ❹ Toyota logo on the hood.



## Prius Identification (Continued)

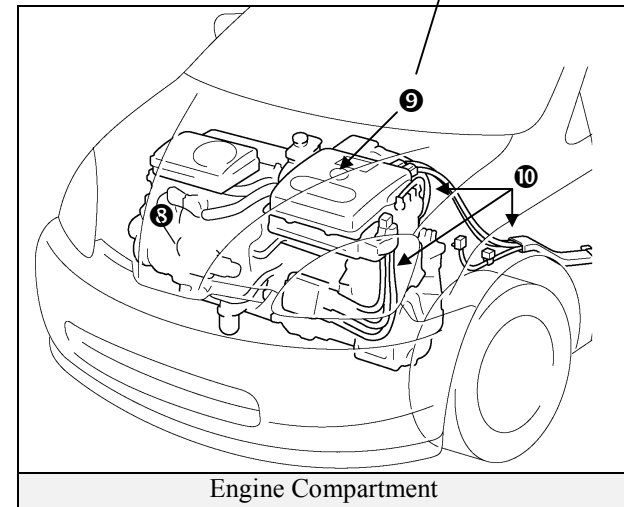
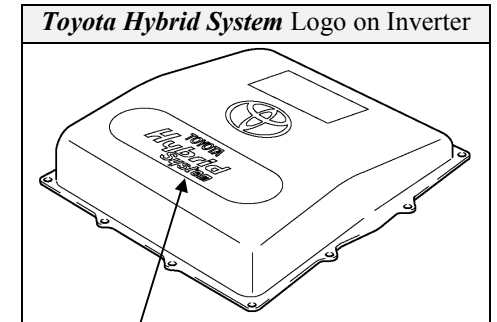
### Interior

- ⑤ Column mounted automatic transmission shift lever.
- ⑥ Instrument cluster (speedometer, fuel gauge, warning lights) located in center dash and near the base of the windshield.
- ⑦ LCD monitor (fuel consumption, radio controls) located below the instrument cluster.



### Engine Compartment

- ⑧ 1.5 liter aluminum alloy gasoline engine.
- ⑨ High voltage inverter box with the *Toyota Hybrid System* logo on the cover.
- ⑩ Orange colored high voltage power cables.

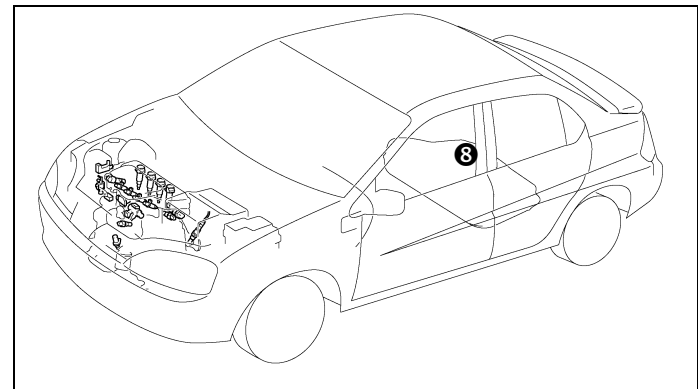
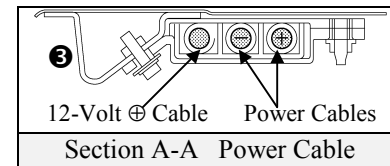
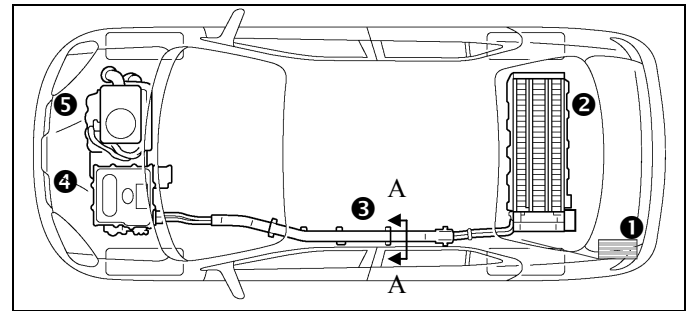
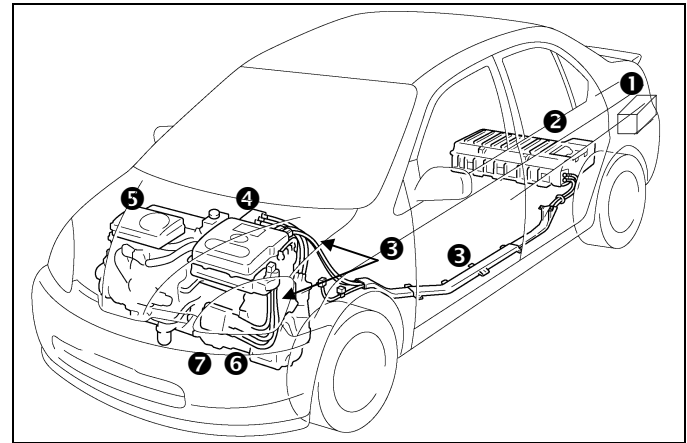


## Hybrid Component Locations & Descriptions

Component	Location	Description
12-Volt ❶ Auxiliary Battery	Trunk, Driver Side	Low voltage lead-acid battery that controls all electrical equipment except electric motor generator, and inverter.
Hybrid ❷ Vehicle (HV) Battery Pack	Trunk, Mounted to Cross Member & Behind Rear Seat	274-Volt Nickel Metal Hydride (NiMH) battery pack consisting of 38 low voltage (7.2-volt) modules connected in series.
Power ❸ Cables	Under Carriage & Engine Compartment	Orange colored power cables carry high voltage Direct Current (DC) between the HV battery pack and inverter. Also carries 3 phase Alternating Current (AC) between inverter, motor, and generator.
Inverter ❹	Engine Compartment	Converts DC electricity from HV battery pack to AC electricity that drives the electric motor. Also, converts AC from electric generator and motor (regenerative braking) to DC that recharges the HV battery pack.
Gasoline ❺ Engine	Engine Compartment	Provides two functions: 1) powers vehicle; 2) powers generator to recharge the HV battery pack. The engine is started and stopped under control of the vehicle computer.
Electric ❻ Motor	Engine Compartment	3 Phase AC permanent magnetic electric motor contained in the transaxle. Used to power the vehicle.
Electric ❼ Generator	Engine Compartment	3 Phase AC generator contained in the transaxle. Used to recharge the HV battery pack.
Fuel Tank ❸ and Fuel Lines	Undercarriage, Passenger Side	Fuel tank provides gasoline via a single fuel line to the engine. The fuel line is routed along passenger side under the floor pan.

### Specifications

Gasoline Engine:	70 hp, 1.5 liter Aluminum Alloy Engine
Electric Motor:	44 hp, Permanent Magnet Motor
Transmission:	Automatic Only
HV Battery:	274-Volt Sealed NiMH
Curb Weight:	2,765 lbs
Fuel Tank:	11.9 gals
Fuel Economy:	52/45 (City/Hwy)
Frame Material:	Steel Unibody & Steel Body Panels



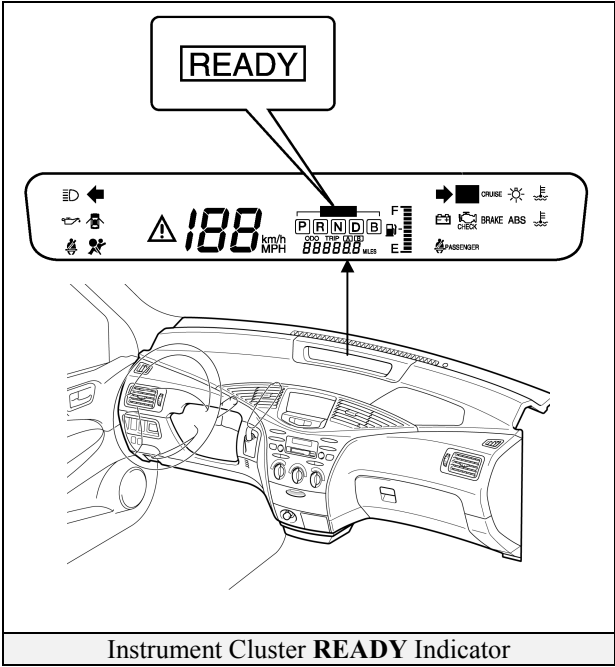
## Gasoline-Electric Hybrid Vehicle Operation

The vehicle starts and becomes operational by turning the ignition key to start just like any other typical automobile. However, the gasoline engine does not idle like a typical automobile and will start and stop automatically. It is important to recognize and understand the **READY** indicator provided in the instrument cluster. When lit, it informs the driver the vehicle is on and operational even though the gasoline engine may be off and the engine compartment is silent.

### Vehicle Operation

- With the Prius, the gasoline engine may stop and start at any time while the **READY** indicator is on.
- Never assume the vehicle is shut off just because the engine is off. Always look for the **READY** indicator status. The vehicle is shut off when the **READY** indicator is off.
- The vehicle may be powered by:
  1. The electric motor only.
  2. The gasoline engine only.
  3. A combination of both the electric motor and the gasoline engine.

The vehicle computer determines the mode in which the vehicle operates to improve fuel economy and reduce emissions. The driver cannot manually select the mode.



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

The Prius contains a high voltage, Hybrid Vehicle (HV) battery pack and a low voltage auxiliary battery. The HV battery pack contains non-spillable, sealed Nickel Metal Hydride (NiMH) battery modules and the auxiliary battery is a typical automotive lead-acid type.

### HV Battery Pack

- The HV battery pack is sealed in a metal case and is rigidly mounted to the trunk floor pan cross member behind the rear seat. The metal case is isolated from high voltage and concealed by a fabric liner in the trunk.
- The HV battery pack consists of 38 low voltage (7.2-Volt) NiMH battery modules connected in series to produce approximately 274-Volts. Each NiMH battery module is non-spillable and sealed in a plastic case.
- The electrolyte used in the NiMH battery module is an alkaline of potassium and sodium hydroxide. The electrolyte is absorbed into the battery cell plates and will form a gel that will not normally leak, even in a collision.
- In the unlikely event the battery pack is overcharged, the modules vent gases directly outside the vehicle through a vent hose connected to each NiMH battery module.

HV Battery Pack	
Battery pack voltage	274-Volts
Number of NiMH battery modules in the pack	38
Battery pack weight	100 lbs
NiMH battery module voltage	7.2-Volts
NiMH battery module dimensions (inches)	11 x 3/4 x 4
NiMH Battery module weight	2.2 lbs

### Components Powered by the HV Battery Pack

- Electric Motor
- Electric Generator
- Inverter
- Power Cables

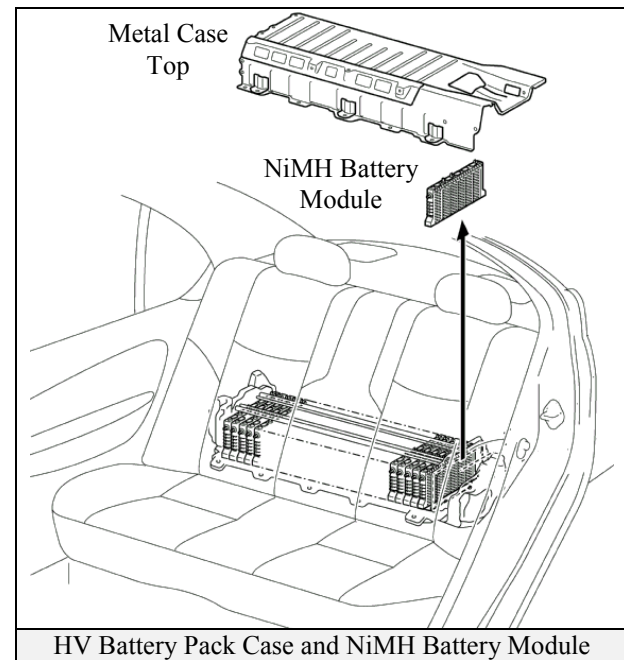
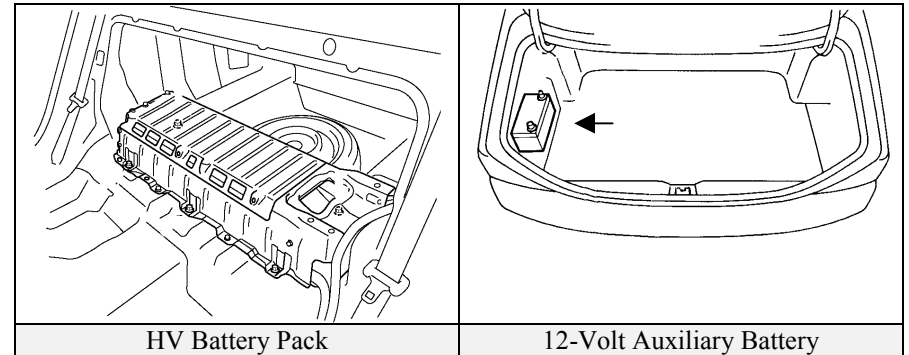
### HV Battery Pack Recycling

- The HV battery pack is recyclable. Contact the nearest Toyota dealer, or:  
United States: (800) 331-4331    Canada: (888) Toyota-8



### Auxiliary Battery

- The Prius also contains a lead-acid 12-Volt battery. This 12-Volt auxiliary battery powers the vehicle electrical system similar to a conventional vehicle. As with other conventional vehicles, the auxiliary battery is grounded to the metal chassis of the vehicle.
- The auxiliary battery is located in the trunk. It also contains a hose to vent gases outside the vehicle if overcharged.



## High Voltage Safety

The HV battery pack powers the high voltage electrical system with direct current (DC) electricity. A positive and a negative power cable are routed from the battery pack, under the vehicle floor pan, to the inverter. Occupants in the vehicle and emergency responders are separated from high voltage electricity by the following systems:

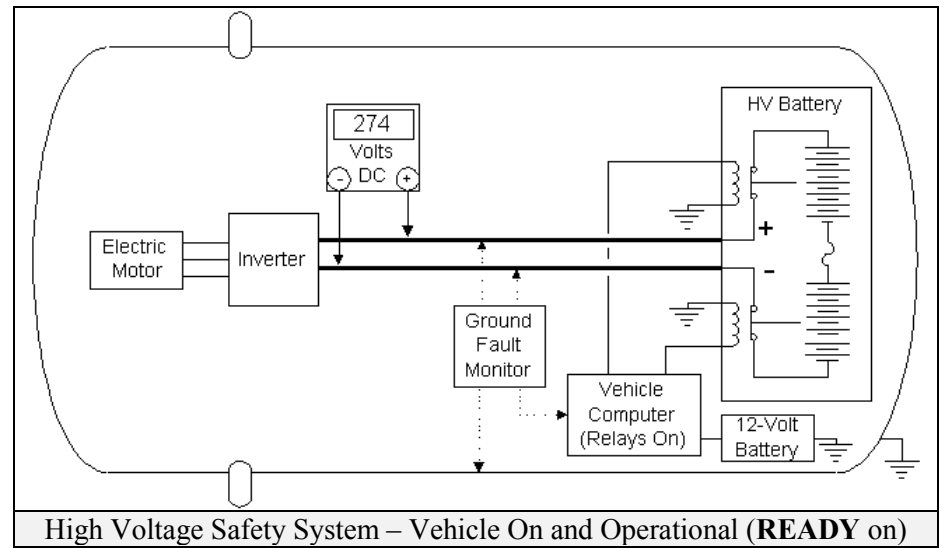
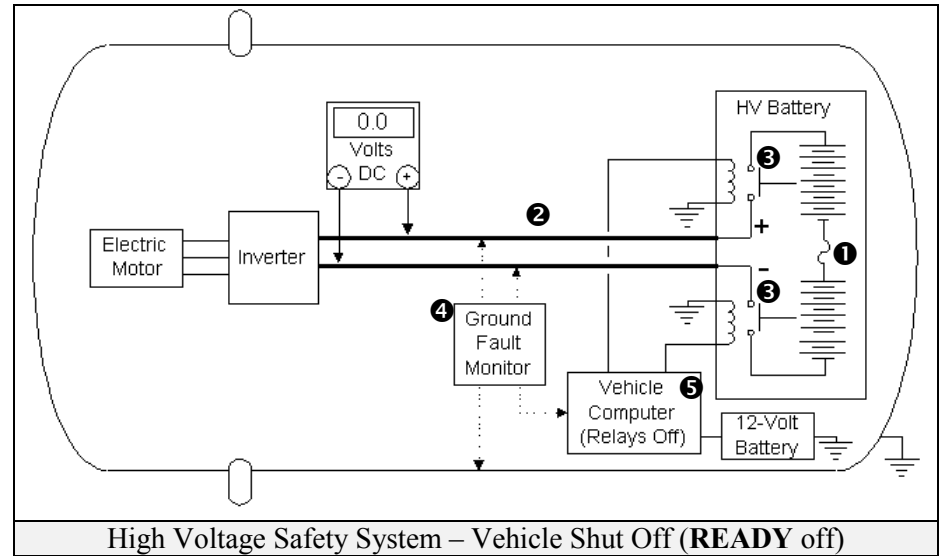
### High Voltage Safety System

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

#### **WARNING:**

- *Power remains in the high voltage electrical system for 5 minutes after the HV battery pack is shut off.*
- *Never touch, cut, or open any high voltage power cable or high voltage component.*

- Both power cables ❷ are isolated from the metal chassis, so there is no possibility of shock by touching the metal chassis.
- 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 vehicle computer ❺ will illuminate the master warning light in the instrument cluster and the hybrid warning light in the LCD display.
- The HV battery pack relays will automatically open to stop electricity flow in a collision sufficient to activate the front SRS airbags.



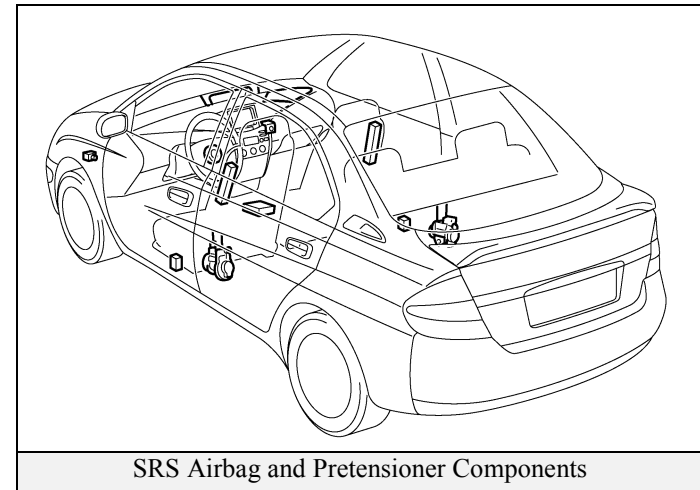
## SRS Airbags and Seat Belt Pretensioners

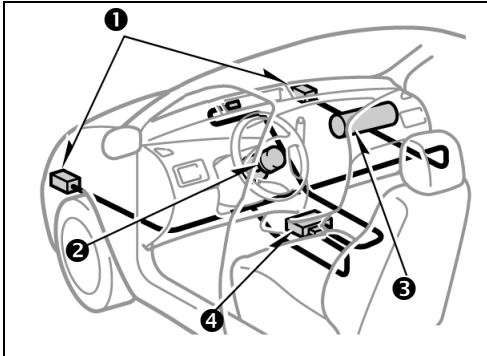
The Prius includes as standard equipment driver and passenger front SRS airbags and front seat belt pretensioners. Side impact SRS airbags contained in the front seats are optional equipment.

The SRS system is equipped with a back up source that powers the SRS airbags up to **90 seconds** after disconnecting the 12-Volt auxiliary battery.

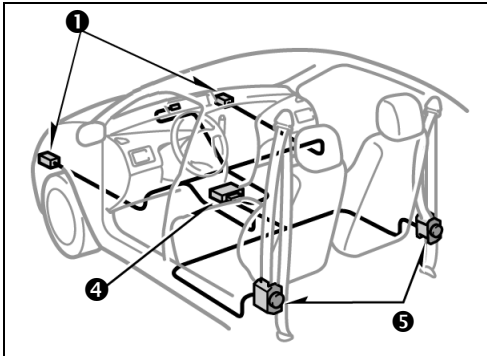
### Airbag and Sensor Locations

- Two front SRS airbag sensors ❶ are mounted in the engine compartment for the driver ❷ and passenger ❸ airbags.
- The SRS computer ❹, which also contains a sensor, is mounted on the floor pan near the center console.
- Front seat pretensioners are mounted in the B-pillar ❺.
- Optional side impact SRS airbags are contained in the front seats ❻. The sensors are mounted in the B-pillar ❼.

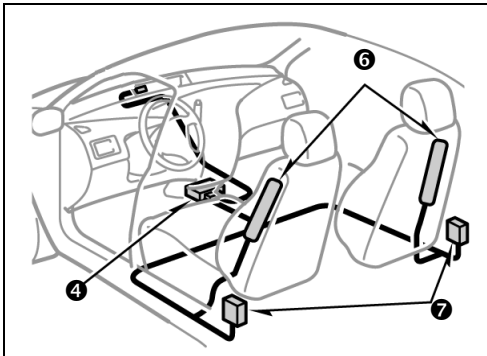




Front Seat Airbag Components



Front Seat Belt Pretensioner Components



Front Seat Side Airbag Components