TOYOTA

PRIUS

Gasoline-Electric Hybrid

Emergency Responder Guide

January 2002 (Version 3)

FOREWORD

This guide was developed to educate and assist emergency responders on the Toyota Prius gasoline-electric hybrid vehicle. Emergency response procedures are similar to other Toyota vehicles, except the high voltage electrical system requires a few additional procedures and safety precautions. Emergency responders must be aware of these differences. By using the information contained in this guide, Prius emergency response can be handled just as safely as the typical automobile.

Emergency responders may not be familiar with the high voltage, approximately 273.6-Volts, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack used in the Prius. Numerous safeguards have been designed into the vehicle to ensure the HV battery pack is kept safe and secure in an accident. High voltage electricity is used only to power the electric motor, generator, inverter, and relating parts thereof. All other electrical systems are powered from a separate 12-Volt battery.

The sealed NiMH batteries are similar to rechargeable batteries used in laptop computers, mobile 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 neutralised 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 the vehicle and would not normally be accessed by emergency responders at the scene of an accident.

This guide provides further details on Prius emergency response. This will include information on these topics:

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

ABN 64 009 686 097

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ABOUT THE PRIUS

The Toyota Prius is a gasoline-electric hybrid vehicle sold in Australia from October 2001. 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 for the gasoline engine, and 2) 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 or total electric vehicle, the Prius never needs to be recharged from an external electric power source.

Utilising the illustration below, the Prius operates in various modes.

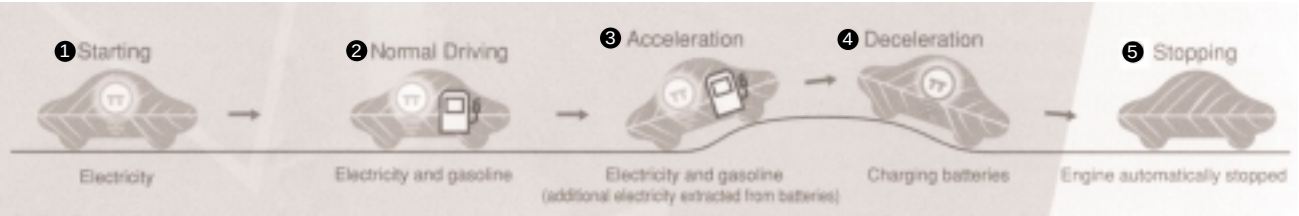
❶ On light acceleration at low speeds, the vehicle is powered by the electric motor. The gasoline engine is shut off.

❷ During normal driving the vehicle is powered mainly by the gasoline engine. The gasoline engine is also used to recharge the battery pack.

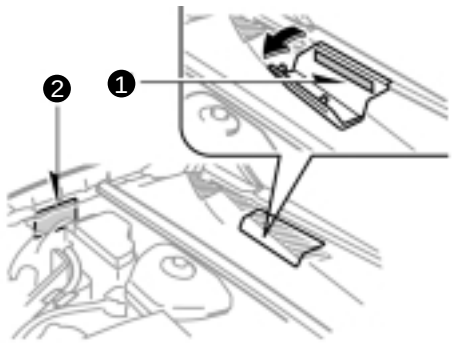
❸ During full acceleration, such as climbing a hill, both the gasoline engine and the electric motor power the vehicle.

❹ During deceleration, such as braking, the vehicle regenerates the kinetic energy from the front wheels to produce electricity that recharges the battery pack.

❺ While the vehicle is stopped, the gasoline engine and electric motor are off, however the vehicle remains on and operational.

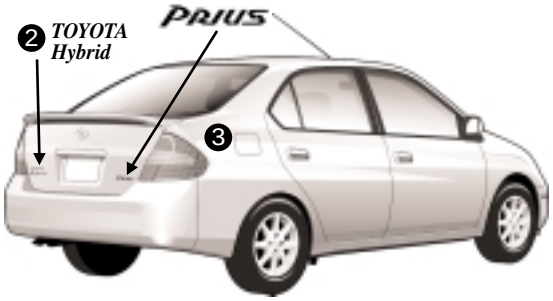


PRIUS IDENTIFICATION



Vehicle Identification Number

Exterior Front View



Exterior Rear & Passenger Side View

Exterior Driver Side View

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

Vehicle Identification Number

❶ Vehicle Identification Number (VIN)
❷ Manufacturer's Plate (Also contains VIN)

The alphanumeric 17 character Vehicle Identification Number (VIN) is provided in the engine compartment as shown.

Example VIN: JT2BK12U810020208
(A Prius is identified by the first 6 alphanumeric characters JT2BK1)

Exterior

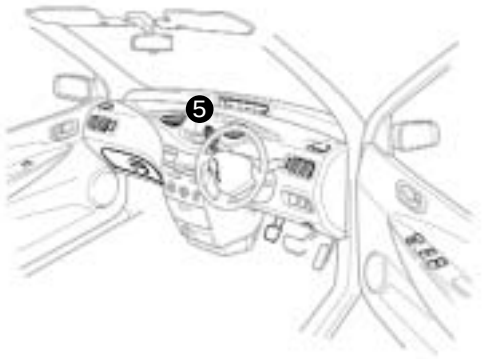
❶ Toyota logo on the hood.

❷ *TOYOTA Hybrid* & PRIUS identification logos on trunk.

❸ Gasoline fuel filler located on the driver's side quarter panel.

❹ A single air vent on the passenger side C-pillar.

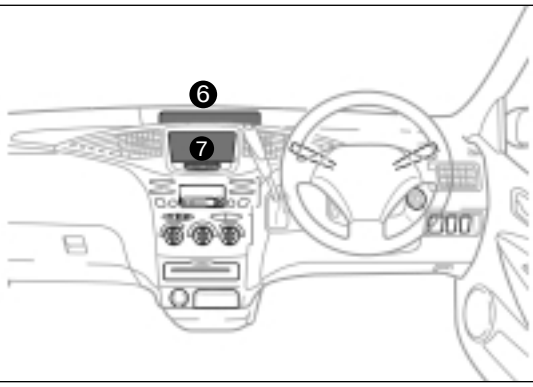
Exterior Front & Driver Side View



Interior View

Interior

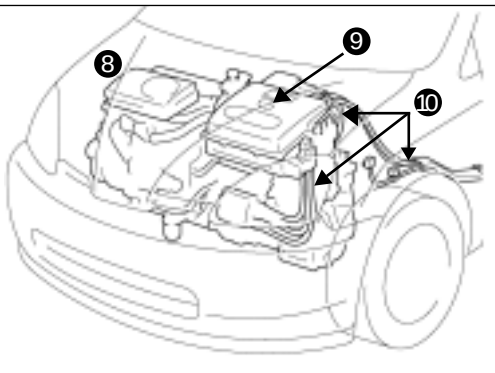
❺ Column automatic transmission shift lever.



Instrument Cluster & LCD Monitor

❻ Instrument cluster (speedometer, fuel gauge, warning lights) located in centre dash and near the base of the windshield.

❼ LCD monitor located below instrument cluster.



Engine Compartment

Engine Compartment

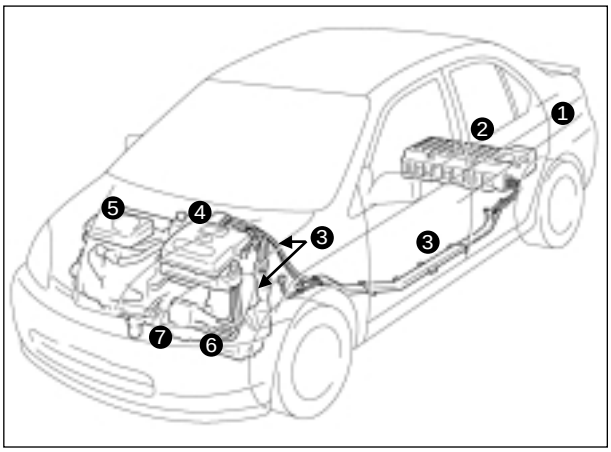
❽ 1.5 litre aluminum alloy gasoline engine.

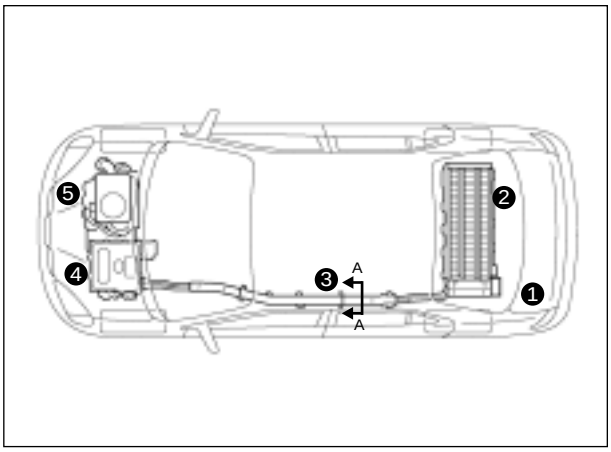
❾ High voltage inverter box with the Toyota Hybrid System logo on the cover.

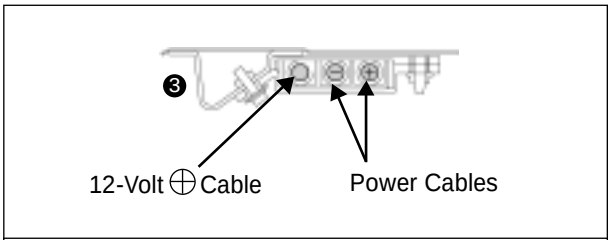
❿ Orange coloured high voltage power cables.

Toyota Hybrid System Logo on Inverter

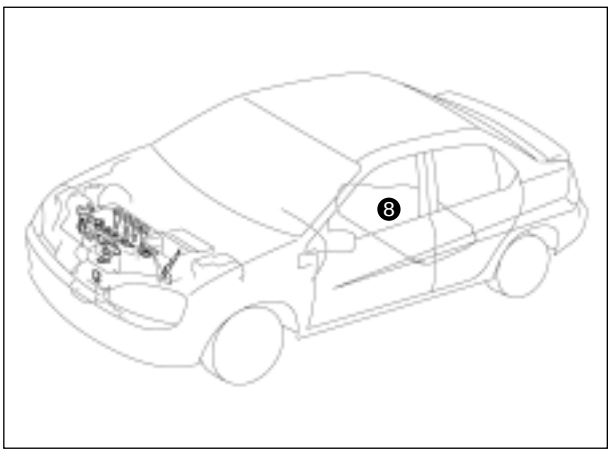
HYBRID COMPONENT LOCATIONS & DESCRIPTIONS







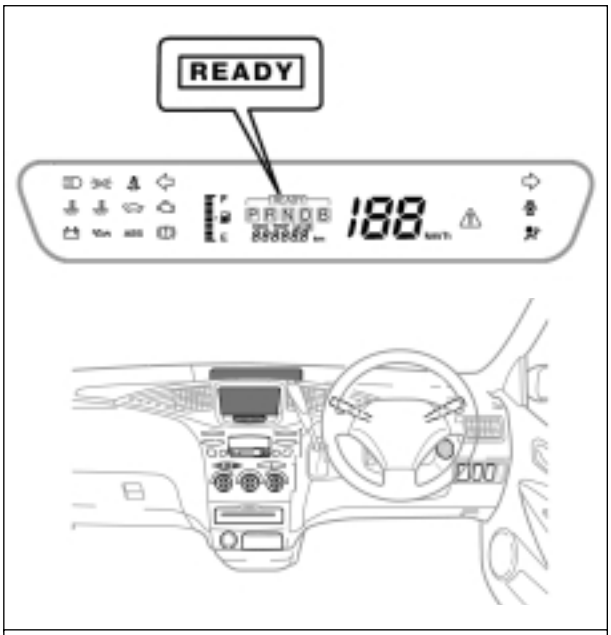
Section A-A Power Cable



COMPONENT	LOCATION	DESCRIPTION
12-Volt Auxiliary Battery ❶	Trunk, Passenger Side	Low Voltage lead-acid battery that controls all electrical equipment except electric motor generator and inverter.
Hybrid Vehicle (HV) Battery Pack ❷	Trunk, Mounted to Cross Member & Behind Rear Seat	273.6-Volt Nickel Metal Hydride (NiMH) battery pack consisting of 38 low voltage (7.2-volt) modules connected in series.
Power Cables ❸	Under Carriage & Engine Compartment	Orange coloured 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 (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 AC permanent magnetic electric motor contained in the transaxle. Used to power the vehicle.
Electric Generator ❼	Engine Compartment	3 Phase U/C generator contained in the transaxle. Used to recharge the HV battery pack.
Fuel Tank and Fuel Lines ❽	Undercarriage, Driver's Side	Fuel tank provides gasoline via a single fuel line to the engine. The fuel line is routed along driver's side under the floor pan.

Specifications

Gasoline Engine:	53kw, 1.5 litre Aluminum Alloy Engine
Electric Motor:	33kw, Permanent Magnet Motor
Transmission:	Automatic Only
HV Battery:	273.6-Volt Sealed NiMH
Curb Weight:	1,250 - 1,265 kg
Fuel Tank:	50 litres
Fuel Economy:	City: 4.6 litres/100km, Highway: 4.2 litres/100km
Frame Material:	Steel Unibody & Steel Body Panels



Instrument Cluster **READY** Indicator

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 recognise and understand the **READY** indicator provided in the instrument cluster. When illuminated, 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

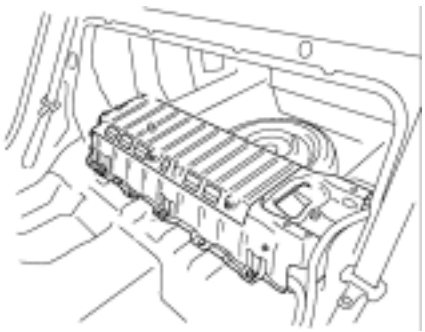
- With the Prius, the gasoline engine may stop and start at any time while the **READY** indicator is on.

- 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.

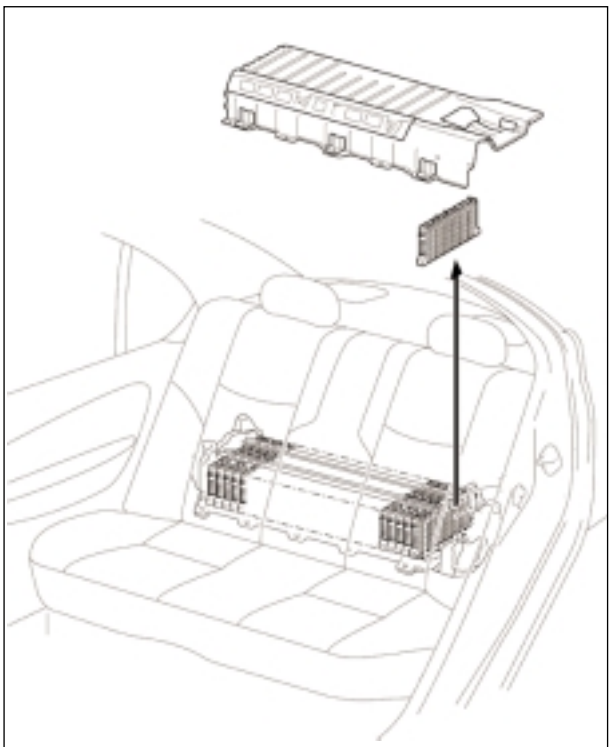
- The vehicle may be powered by:
  1. The electric motor only.
  2. The gasoline engine only.
  3. A combination of both the electric motor and the gasoline engine.

The driver cannot manually select the mode in which the vehicle operates.

HYBRID VEHICLE (HV) BATTERY PACK AND AUXILIARY BATTERY



HV Battery Pack



HV Battery Pack Metal Case and NiMH Battery Module

The high voltage, Hybrid Vehicle (HV) battery pack contains non-spillable, sealed Nickel Metal Hydride (NiMH) battery modules. The NiMH battery modules resemble those used in a variety of consumer electronics such as mobile phones and laptop computers.

Characteristics

- 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 273.6-Volts. Each NiMH battery module is encased in plastic.
- 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 vent hoses connected to each NiMH battery module.

HV BATTERY PACK	
Battery pack voltage	273.6-Volts
Number of NiMH battery modules in the pack	38
Battery pack weight	52 kg
NiMH battery module voltage	7.2-Volts
NiMH battery module dimensions (mm)	279 x 19 x 102
NiMH Battery module weight	1.0 kg

HYBRID VEHICLE (HV) BATTERY PACK AND AUXILIARY BATTERY

12-Volt Auxiliary Battery

Components Powered by the HV Battery Pack

- Electric Motor
- Electric Generator
- Inverter
- Power Cables

Recycling

- The HV battery pack is recyclable. Contact the nearest Toyota Prius dealer or the Toyota Customer Relations Centre on 1800 252 097 for information.

12-Volt Auxiliary Battery

- The Prius also contains a typical 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 12-Volt auxiliary battery is grounded to the metal chassis of the vehicle.

- The 12-volt battery is located in the trunk so it also contains a hose to vent gases outside the vehicle if overcharged.

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 exiting 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.

CAUTION

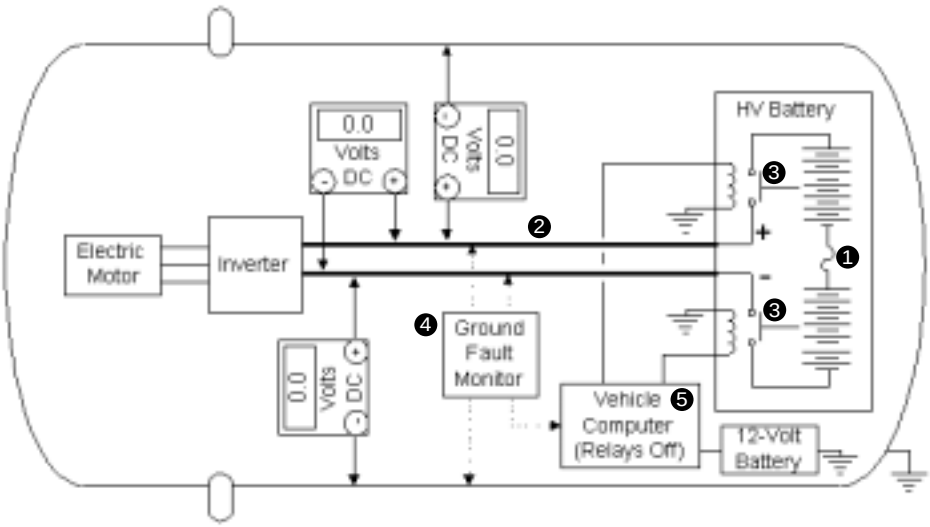
- *Power remains in the high voltage electrical system for 5 minutes after the HV battery pack is shut off.*
- *Never cut high voltage power cables or open high voltage components.*

- Both power cables ❷ are isolated from the metal chassis, so there is no possibility of shock by touching the metal chassis.

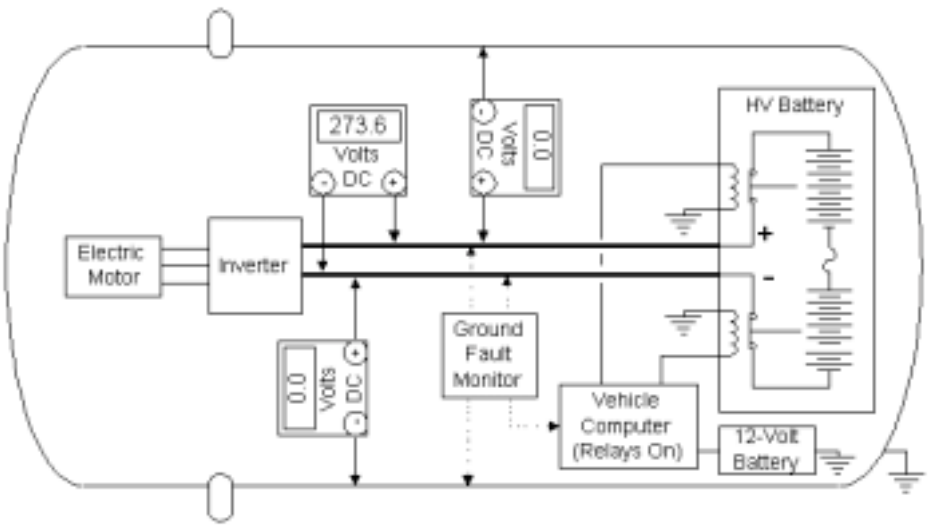
- A ground fault monitor ❹ continuously monitors for high voltage leakage to the metal chassis. If a malfunction is detected, the vehicle computer ❺ will immediately open the HV battery pack relays and stop electricity flow.

- The HV battery pack relays will automatically open to stop electricity flow in a collision sufficient to active the SRS airbags.

HIGH VOLTAGE SAFETY

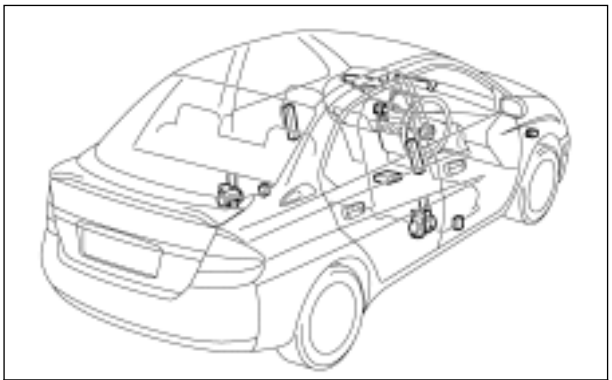


High Voltage Safety System – HV Battery Pack Relay Off

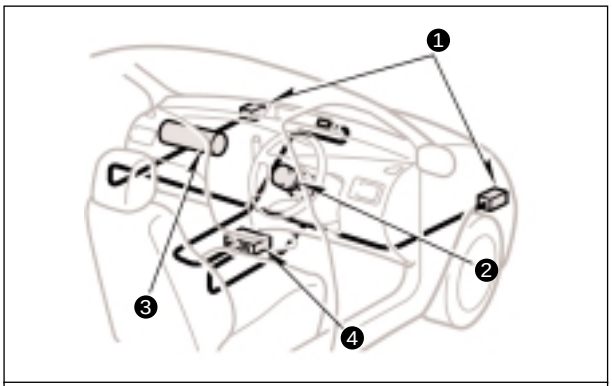


High Voltage Safety System – HV Battery Pack Relay On

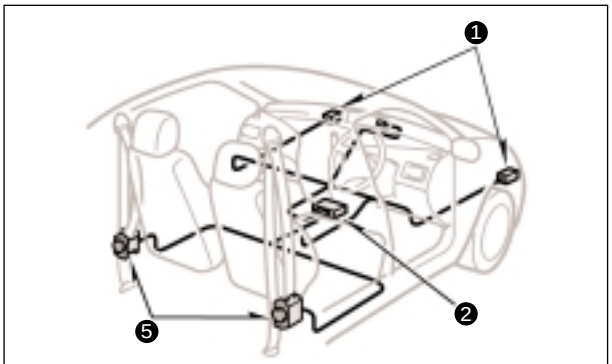
SRS AIRBAGS AND SEAT BELT PRETENSIONERS



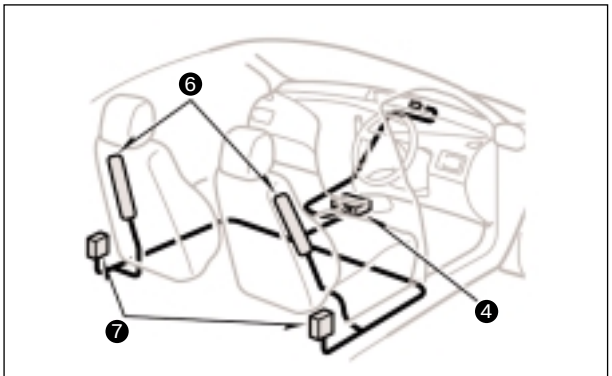
SRS Airbag and Pretensioner Components



Front Seat Airbag Components



Front Seat Belt Pretensioner Components



Front Seat Side Airbag Components

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

The SRS airbags are 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 centre 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.

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

Never assume the Prius is shut off simply because it is silent. Always look at the instrument cluster for the **READY** indicator status to verify whether the vehicle is on or shut off.

Extrication

- Immobilise Vehicle
  - Chock wheels and set the parking brake. ❶❷
  - Move the shift lever to the P (park) position. ❸

- Disable Vehicle (HV battery pack, SRS airbags, & gasoline fuel pump)
  - Turn the ignition key off, remove the ignition key, and place on dash.
  - Disconnect 12-Volt auxiliary battery. ❹❺

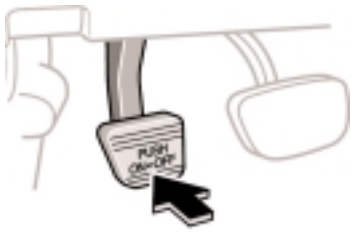
-OR (if the ignition key is inaccessible)-

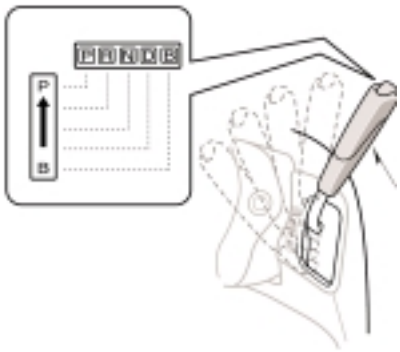
Disconnect the 12-Volt auxiliary battery.
Remove the IGCT relay in the engine compartment as shown in the illustration. ❻❼❽

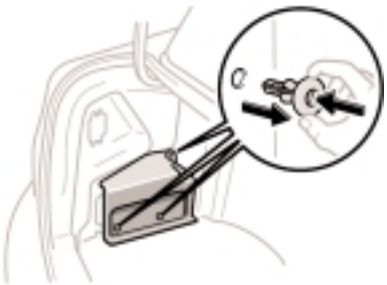
CAUTION

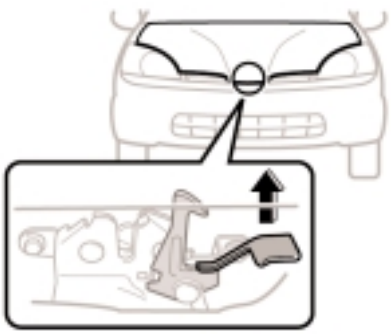
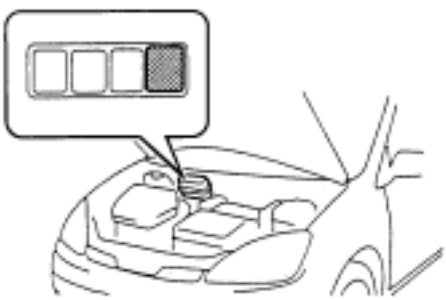
- *After disabling the vehicle, power is maintained for 90 seconds in the SRS system and for 5 minutes in the high voltage electrical system.*
- *If either of the disabling steps above cannot be performed, proceed with caution as there is no assurance that the high voltage electrical system, SRS, or fuel pump are disabled.*
- *Never cut any orange high voltage power cables or open high voltage components.*

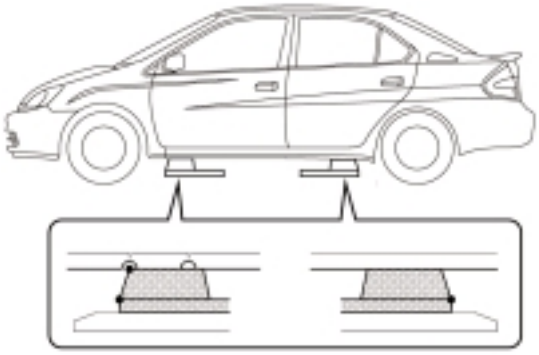
EMERGENCY RESPONSE

❶	❷
	
Chock Wheels	Set Parking Brake

❸	❹
	
Move Shift Lever to Park	Remote Trunk Opener (Driver Side)

❺	❻
	
12-Volt Auxiliary Battery Cover	Remote Hood Release

❼	❽
	
Hood Latch Release	IGCT Relay Location



Jacking Support Points

Tilt Steering Control

Front Seat Controls

Extrication (cont)

- Stabilise Vehicle
  Support at (4) points directly under the front and rear pillars.
  Do not place jacking support under the high voltage power cables, exhaust system, or fuel tank.

- Access Patients
  Glass Removal
  Use normal glass removal procedures as required.

  Door Removal/Displacement
  Doors can be removed by conventional rescue tools - hand, electric and hydraulic. In certain situations, it may be easier to pry back the body to expose and unbolt the hinges.

  Dash Displacement
  Displace the dash by using a conventional dash roll, Modified Dash Roll, or jacking the dash.

  Roof Removal
  The roof may be removed as there are no SRS airbag devices above the door line.

  Rescue Lift Air Bags
  Responders should not place rescue lift airbags under the high voltage power cables, exhaust system, or fuel tank.

  Steering and Seat Controls
  Tilt steering and seat controls are shown in the illustration

Fire

Approach and extinguish a fire using proper vehicle fire fighting practices.

- 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 Prius until the fire has been knocked down and hazard assessment operations commence.

- Fire in the HV Battery Pack
  Should a fire occur in the NiMH HV battery pack, the incident commander will have to decide whether to pursue an offensive or defensive attack.

  Potassium hydroxide and sodium hydroxide are key ingredients in the NiMH battery module electrolyte. The modules are contained within a metal case and access is limited to a small opening on the top. The cover should **NEVER** be breached or removed under any circumstances, including fire. Doing so may result in severe electrical burns, shock or electrocution.

  When allowed to burn themselves out, the Prius NiMH battery modules burn rapidly and can quickly be reduced to ashes except for the metal alloy cell plates.

  Offensive Fire Attack
  Flooding the trunk 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.

  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.

Hazard Assessment

During hazard assessment, if not already done, immobilise and disable the vehicle. See illustrations on page 13.

- Immobilise Vehicle
  Chock wheels and set the parking brake.
  Move the shift lever to the P (park) position.

- Disable Vehicle (HV battery pack, SRS airbags, & gasoline fuel pump)
  Turn the ignition key off, remove the ignition key, and place on dash.
  Disconnect 12-Volt auxiliary battery.

  -OR (if the ignition key is inaccessible)-

  Disconnect the 12-Volt auxiliary battery.
  Remove the IGCT relay in the engine compartment.

CAUTION

- *After disabling the vehicle, power is maintained for 90 seconds in the SRS system and for 5 minutes in the high voltage electrical system.*
- *If either of the disabling steps above cannot be performed, proceed with caution as there is no assurance that the high voltage electrical system, SRS, or fuel pump are disabled.*
- *Never cut any orange high voltage power cables or open high voltage components.*

Recovery/Recycling NiMH HV Battery Pack

Clean–up of the HV battery pack can be accomplished by the vehicle recovery crew without further concern from runoff or spill. The recovery crew may contact a Toyota dealer or Toyota Customer Relations Centre 1800 252 097 for information regarding recycling of the HV battery pack.

Spills

The Prius contains the same common automotive fluids used in other Toyota vehicles, with the exception of the NiMH electrolyte used in the HV battery pack. Responders may not be familiar with the NiMH battery electrolyte, which is a strong caustic alkaline (pH 13.5) that is destructive to human tissues. The electrolyte is absorbed in the cell plates and will not normally spill or leak out even if a battery module is cracked. An extremely catastrophic crash that would breach both the metal case and the plastic NiMH battery module would be a rare occurrence.

Similar to using baking soda to neutralise a lead-acid battery electrolyte spill, a dilute boric acid solution or vinegar is used to neutralise a NiMH battery electrolyte spill.

For further information, refer to the Material Safety Data Sheet on page 20.

- Handle NiMH Electrolyte Spills Using The Following Personal Protective Equipment (PPE):
  - Splash shield or safety goggles.
  - Fold down helmet shields are not acceptable for alkaline spills.
  - Rubber, latex or Nitrile gloves.
  - Apron suitable for alkaline.
  - Rubber boots.

- Neutralise NiMH Electrolyte
  - Use a boric acid solution (800 grams boric acid to 20 litres water) or vinegar.

First Aid

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 during an exposure.

- Wear Personal Protective Equipment (PPE)
  - Splash shield or safety goggles.
  - Fold down helmet shields are not acceptable for acid or alkaline spills.

  - Rubber, latex or Nitrile gloves.
  - Apron suitable for alkaline.
  - Rubber boots.

First Aid (cont)

• Absorption

Perform gross decontamination by removing affected clothing and properly disposing of the garments.
Rinse with water for 20 minutes.
Transport to the nearest emergency medical care facility.

- Inhalation Non-Fire Situations

No toxic gases are reported by the manufacturer under normal conditions.

- Inhalation Fire Situations

Toxic gases are given off as the by-product of combustion. All responders in the Hot Zone should wear the proper PPE for fire fighting, including SCBA.
Remove patient from the hazardous environment, move them to a safe area, and administer oxygen.
Transport to the nearest emergency medical care facility.

- Ingestion

Drink water to dilute electrolyte.
Perform gross decontamination by removing affected clothing and properly disposing of the garments.
Transport to the nearest emergency medical care facility.

Submersion

When the Prius is fully or partially submerged, remove the vehicle from the water, shut off the vehicle, and then drain the water from the vehicle. The HV battery pack is isolated from the chassis, so there is no danger of shock by touching the metal chassis.

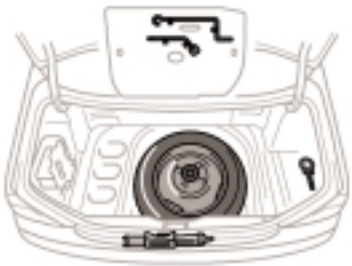
The submerged vehicle may already be shut off. To ensure the vehicle is shut off, turn the ignition key off and verify the **READY** indicator is off in the instrument cluster.

No special or unusual handling is necessary for Prius roadside assistance. The vehicle may be handled like any other Toyota vehicle, but the following information may be useful for guidance.

Towing

The Prius is a front wheel drive vehicle. Tow with the front wheels off the ground.

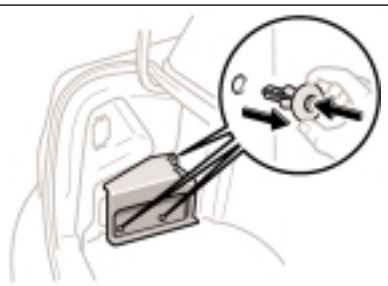
- To shift the vehicle to neutral, turn the ignition switch on, press the brake, and while pressing the shift lever button, move the lever to the N (neutral) position.



Spare Tyre and Tool Location

Spare Tyre

The spare tyre, jack, and tools are provided in the trunk as shown in the illustration.

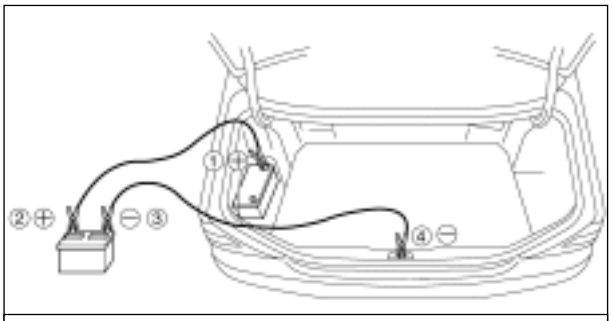


Access 12-Volt Battery In Trunk

Jump Starting

The Prius 12-Volt auxiliary battery may be jump started if the vehicle does not start and the dash gauges are dim or off after turning the ignition key to start.

- The 12-Volt auxiliary battery is located on the passenger side of the trunk. Follow the numbered sequence to connect the jumper cables as shown in the illustration.
- The high voltage HV battery pack cannot be jump started.



12-Volt Battery Jumper Cable Connections

Alarm & Immobiliser

The vehicle comes standard with a keyless remote alarm and a coded key immobiliser system.

- The vehicle may only be started with a learned immobiliser coded key.
- A factory alarm system is standard equipment. To disable the alarm, use the unlock button on the keyless remote, unlock either front door lock with the key, or insert the key into the ignition switch and turn to the ON position.

MATERIAL SAFETY DATA SHEET

Nickel/Metal Hydride Battery (EV-P6R5)

SECTION I – Chemical Product & Company

Manufacturer's Name Panasonic EV Energy Co., Ltd.	Manufacturer's Emergency Telephone Number (81)-53-577-3112. Munehisa Ikoma
Manufacturer's Mailing Address 555 Sakai juku, Kosai, Shizuoka 431-0452 JAPAN	Data Prepared Aug. 28, 1999
	Signature of Preparer (Optional)

SECTION II – Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Name (s))	OSHA PEL ACGIH TLV	Other Limits Recommended	Formulation (%) W/V	
Ni (OH)2			0~16%	W
NiOOH			0~17%	W
MmNiCoMnAl			2~21%	W
(MmNiCoMnAl) Hx			3~22%	W
KOH and NaOH and LiOH			12%	W

Other Material:

Battery Case: Plastics (PPE/PP/HSBBC/HSIBC Blend)

PPE: Poly Phenylene Ether, PP: Polypropylene
HSBBC: Hydrogenated Styrene Butadiene Block Copolymer
HSIBC: Hydrogenated Styrene Isoprene Block Copolymer

Separater: Polypropylene-Polyolefine mixed Sheet

SECTION III – Physical/Chemical Characteristics

Boiling Point Approximate 170˚C	Specific Gravity (H_2O=1) 1.9
Vapor Pressure (mm Hg) N/A	Melting Point N/A
Vapor Density (Air=1) N/A	Evaporation Rate (Butyl Acetate =1) N/A
Solubility in Water (v/v)	N/A

Appearance and Odor

Note:

- Nickel/Metal hydride battery is solid and sealed by the plastic case. It will not generate any gas in the static condition. In the atmosphere, and in the water, it retains the solid condition.
- In the non-static condition, it may generate oxygen (0_2) when overcharged status and hydrogen (H2) when overdischarged. Via the safety vent inside the Nickel/Metal hydride battery, these gases may vent out of the case to the atmosphere. Speed of gas generation and volume of gas generation depend upon the charging or discharging condition.

SECTION IV – Fire and Explosion Hazard Date

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A			

Note:

- No flash or explosion in the normal situation.
- Flash may be possible in the following cases:
  – Sparking in the case of the short-circuit.
  – Internationally discharging the cell and/or the module battery with extremely high current.
- Explosion may be possible in the following case:

  The Cell itself will not explode if abused because of its safety vent mechanism. However, if the cell is housed in a sealed vessel, the cell may explode with an ignition source because of the combination of oxygen (0_2) and hydrogen (H_2) gases generated by the cell.
- Unusual fire and explosion hazards.

Extinguishing media

• CO_2 • Sand • Large amounts of water

Special Fire-fighting Procedures

N/A

Unusual fire and explosion hazards

- In abnormal usage, there is the possibility of explosion.
- The abnormal usage conditions:
  – Cell was overcharged and overdischarged.
  – Cell was higher than 100˚C.
  – Cell is discharged and charged in a sealed vessel with an ignition source.

SECTION V – Reactivity Data

Stability	Unstable		Conditions to Avoid
Stable	Stable	○	

Incompatibility (Materials to Avoid)

N/A

Hazardous Decomposition or By-products

- Disassembling the module battery – • Danger of short-circuiting.
- Disassembling the single cell – • Danger of short-circuiting.
  • Alkaline liquid out.
  • Alkaline liquid to the skin.

Hazardous	May Occur		Conditions to Avoid
Polymerisation	Will Not Occur	○	

SECTION VI – Health Hazard Data

Route (s) Entry: Inhalation? Skin? Ingestion?

- Inhalation: Any poisonous gas will not be generated. Inhalation of the gas is not harmful.
- Skin: In the normal situation, damage to skin will not occur. However, in the abused situation, the electrolyte (alka-line liquid) may leak out of the case which may damage the skin if touched.
- Ingestion: No ingestion.

Health Hazards (Acute and Chronic)

Will not give any hazards in the long run. However, leaked liquid may damage the skin if touched.

Carcinogenicity: TNP? IARC Monographs? OSHA Regulated?

No Carcinogen

Signs and Symptoms of Exposure

–

Medical Conditions Generally Aggravated by Exposure

–

Emergency and First Aid Procedures

–

SECTION VII – Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Do not disassemble the module and the cell. If disassembled, store the module and the cell under water immediately and take precautions to ensure that the alkaline liquid, which may have leaked out of the module does not contact the eyes. If the alkaline liquid does make contact with the eyes, wash them immediately with a large amount water and/or boric acide aqueous solution.

If the alkaline liquid has contacted the skin, immediately wash the skin with a large amount of water and/or boric acide aqueous solution.

Waste Disposal Method

To be disposed in the discharged condition.

Precautions to Be Taken in Handling and Storing

Never short-circuit the cells and/or the module battery. If short-circuited, body may be burned or injured.

Other Precautions

SECTION VIII – Control Measures

Respiratory Protection (Specify Type)
In the normal condition, it is not needed specifically.

Ventilation	Local Exhaust	Special
	Mechanical (General)	Other

Note

- The module battery should not be placed in a sealed vessel.
- The module battery requires ventilation during usage.

Protective Gloves Rubber	Eye Protection Wear splash proof goggles

Note

- In the case of internationally disassembling the cell and/or the module battery, protection against the anti-alkaline must be used.

Other Protective Clothing of Equipment

N/A

Work/Hygienic Practices

N/A

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