

SECTION 1-2

FEATURES ON NEW TOYOTA VEHICLE

Toyota hybrid system

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Toyota hybrid system

Toyota hybrid system combines a gasoline engine and electric motor power to improve the fuel economy and minimize the emissions as well as to provide better power performance than the ordinary gasoline-powered vehicles.

Depending on the driving condition, the vehicle runs on the best combination of;

- Gasoline engine power
- Electric motor power generated by the gasoline engine
- Electric motor power of the hybrid battery

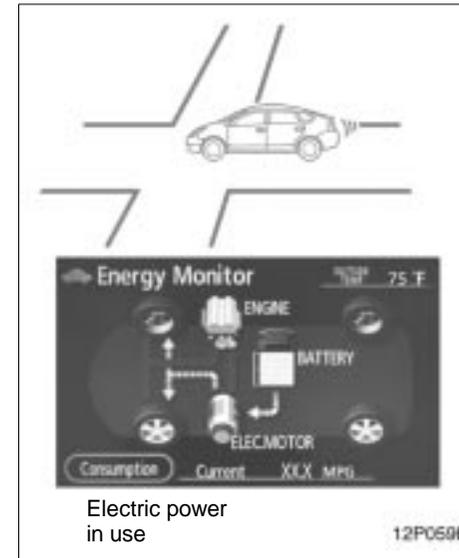
Furthermore, the energy is efficiently used in the following ways:

- When stopping the vehicle, the gasoline engine is automatically stopped.
- When applying the brakes or decelerating, electricity is converted from the turning force of the wheels and stored in the hybrid battery. (This is called regenerative brake.)

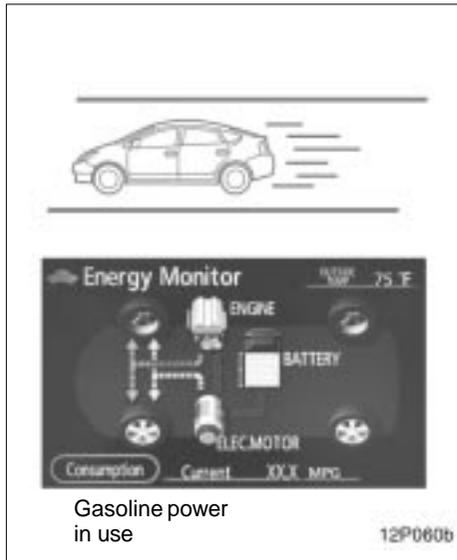
Since the battery is charged by the gasoline engine as needed, it does not require charging from an outside source like an electric vehicle.

Toyota hybrid system operating condition

Basic operations are described below. Besides, Toyota hybrid system performs various controls depending on the operating condition: The "Energy Monitor" screen tells you which power is used currently.

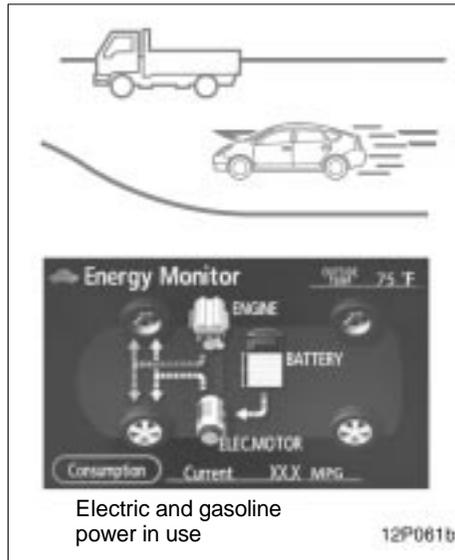


When starting or backing up, etc., the vehicle runs on electric power from hybrid battery, because the gasoline engine efficiency is low.

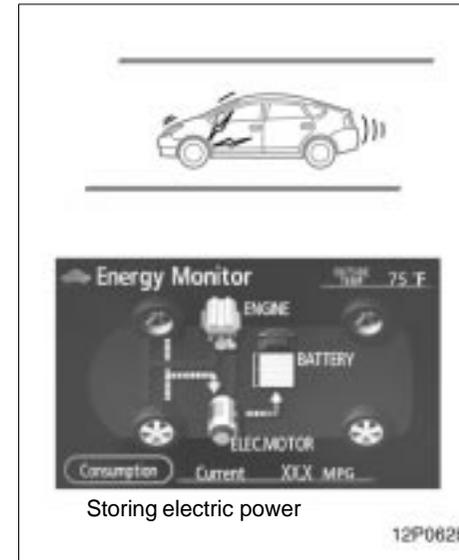


During normal driving, the vehicle runs mainly on gasoline power. However, the electric motor, using electric power generated by the gasoline engine, can supplement the gasoline engine power.

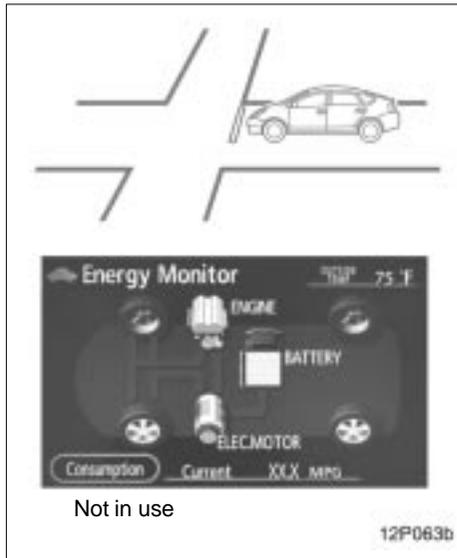
The vehicle controls the optimum ratio of the gasoline and electric power to help use energy more efficiently.



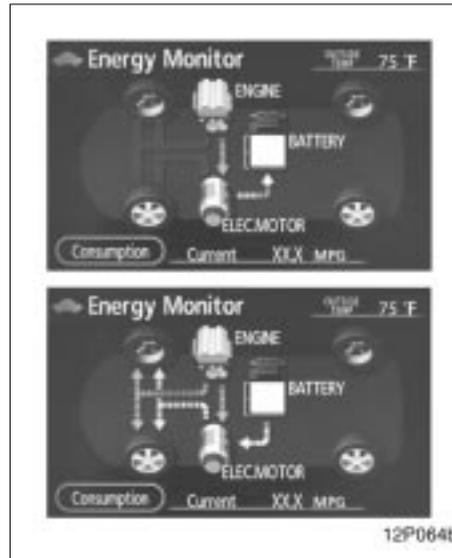
When driving at full throttle, additional electric power is applied from the hybrid battery. Vehicle performance improves.



When decreasing speed or applying the brakes, the turning force of the wheels makes the electric motor operate as a generator and additional electricity is stored in the hybrid battery (regenerative brake).



When stopping, the gasoline engine automatically shuts off.



Charging hybrid battery

When the hybrid battery power is insufficient, the gasoline engine charges the hybrid battery. The system always supplies electricity at a constant level.

Starting your vehicle

Your vehicle is equipped with push button start system. The hybrid system will start automatically by pressing the “POWER” switch briefly with the brake pedal depressed.

With smart function

1. Carry the key with you.
2. Press the “POWER” switch briefly with the brake pedal depressed.

Without smart function

1. Insert the key.
2. Press the “POWER” switch briefly with the brake pedal depressed.

The “READY” light flashes and stays on. Two beeps sound after a few seconds, and the hybrid system will start. (If the ambient temperature is low such as during winter, it may take time until the “READY” light comes on.) You cannot start your vehicle when the brake pedal is not depressed. (For details, see “How to start the hybrid system—” on page 350.)

The engine may not start even with the “READY” light on.

For efficient use of your vehicle

Drive your vehicle with a smooth acceleration and deceleration.

- While driving, energy is recovered through the regenerative brake as the vehicle decelerates. However, for more efficient use, do not accelerate or decelerate your vehicle more than necessary.
- Avoid abrupt acceleration and deceleration.
- The remaining capacity of the hybrid battery can be confirmed on the energy monitor screen of the multi-information display. See "Information" on page 166 for details. Gradual or non-abrupt acceleration or deceleration will more effectively use the benefits of an electric motor without having to use gasoline engine power.

When parking, be sure to put the hybrid transaxle in "P". While driving, use the hybrid transaxle in "D".

- In "N", the gasoline engine operates but electricity cannot be generated. The battery will be discharged requiring unnecessary engine power to recharge.
- The hybrid system automatically recharges the hybrid battery when the remaining battery power is reduced. However, the charging is not available if the hybrid transaxle is "N".

INFORMATION

The gasoline engine starts and stops automatically. (It stops during a low load driving, deceleration or when the vehicle is stopped.)

If the "READY" light remains on, you can start your vehicle using the electric motor even with the gasoline engine stopped.

The gasoline engine may not stop automatically in the following conditions:

- *During gasoline engine warm-up*
- *During hybrid battery charging*
- *During low or high hybrid battery temperature*

Precautions for use

The vehicle runs in combination with the gasoline and electric power. Pay special attention to the following items.

Be careful of high voltage and high temperature.

Your vehicle is equipped with the orange colored cables connected to the hybrid battery (about 200 V) and to other components that are all high voltage.

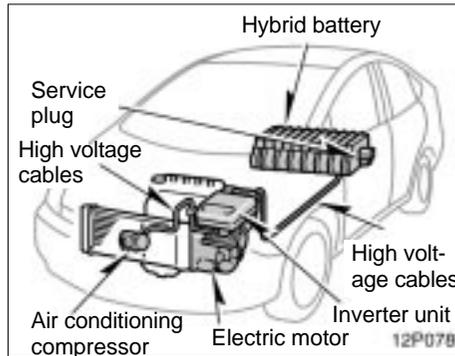
CAUTION

Do not touch or come in contact with orange cables or battery terminals. Electric shock may cause serious injury or death. Read all caution labels.

An electric motor, coolant radiator and some other parts reach high temperature while driving. Caution labels are applied to these parts. Carefully observe the instructions on these caution labels.

CAUTION

Never remove or disassemble any high voltage part, high voltage cables (orange color) and their connectors. It may cause death or serious injury.



Do not touch the service plug.

The service plug is installed in the left side trim of the luggage compartment. It is provided to disable high voltage current from the hybrid battery when the vehicle is in need of repairs at your Toyota dealer.

CAUTION

- The shaded parts in the illustration are subjected to high voltage.
- Inappropriate handling may cause an electric shock resulting in serious injury or death. Never touch any item in shaded area.

These high voltage parts or cables consisting of an electromagnetic shielding structure produce relatively the same amount of electromagnetic waves as conventional gasoline-fueled vehicles or home electric appliances.

As unwanted noise may occur in the reception of mobile radios, contact your Toyota dealer for installation or removal.

Always keep your hybrid vehicle's driving characteristics in mind.

CAUTION

The driver should pay full attention around the vehicle especially when it is driven only by the electric motor (with the gasoline engine stopped). People in the immediate area might misjudge the hybrid vehicle movement based on the absence of the regular engine noise.

- As the vehicle runs with both the gasoline engine and electric motor, you may hear a motor sound coming from the engine compartment.
- When the hybrid system is started or stopped, you may hear a sound coming from the hybrid battery in the luggage compartment. However, this does not indicate any trouble.
- If the “READY” light is on, you can start even though the gasoline engine may be off.
- When you shift the shift lever to “B” and release it to its original position and your foot from the accelerator pedal, engine braking will be applied. However, during high speed driving you may feel that deceleration by engine braking is less than that of ordinary vehicle.

Be sure to put the hybrid transaxle in “P” when parking.

In “N”, the hybrid battery assembly is not charged, even if the gasoline engine is operating. You cannot run your vehicle if the hybrid transaxle is left in “N” for a long time because the hybrid battery assembly will be discharged.

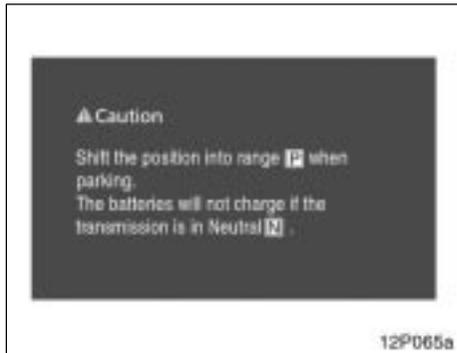
When you leave your vehicle, put the hybrid transaxle in “P” and set the parking brake. Be sure to carry the key with you and lock all the doors.

If you leave the hybrid system in “ACC” or “IG-ON”, the hybrid system may not start because the 12 volt battery will be discharged.

If the vehicle is parked for a long time, the hybrid battery will discharge gradually. To keep the hybrid battery in good condition, drive the vehicle at least once every several months for at least 30 minutes or ten miles. If the hybrid battery becomes fully discharged and the vehicle will not start even with a jump-start to the 12 volt battery, contact your Toyota dealer.

 **CAUTION**

- When you leave your vehicle, be sure to shut off the hybrid system.
- Be sure to put the hybrid transaxle in “P” because the vehicle can start with the “READY” light on and the engine stopped (no engine sound and vibration). When the “READY” light is on, if you leave your vehicle in shift position other than “P” and “N”, the vehicle will creep and start abruptly with the accelerator pedal being depressed by mistake. This may cause death or serious injury.



Type 1



Type 2

When the multi-information display shows this message, the master warning light (⚠) comes on in the instrument cluster. Read the message and follow the instruction.

- When you leave your vehicle, or stop or park for a while, put the hybrid transaxle in "P".
- Charging is necessary. In "N", charging will not be applied. The electric generator operates in "P", "D" or "B". If you continue driving, put the hybrid transaxle in "D" or "B" and depress the accelerator pedal. Do not leave the hybrid transaxle in "N". When driving in traffic jam, operate in "D".



Do not allow anyone to lean against the side of the rear right seatback, nor put any luggage or other obstructions on it.

- An air vent is provided on the side of the rear right seatback to cool the hybrid battery. If this vent is covered, the hybrid battery will overheat resulting in a reduction of the output performance of the hybrid system.
- The seat belt not properly set in the guide on the top of the rear seat may block the air vent. Be sure to pass the seat belt through the guide properly.

- Do not wet or put foreign objects over the air vent. Otherwise, the hybrid battery may be adversely affected and be damaged.
- You may hear a cooling fan noise from the air vent.
- If water is used to wash the inside of the vehicle or inside the luggage compartment, or a large volume of water is spilled in these areas, the hybrid battery may be damaged, or a short circuit may occur.

For vehicle repairs or maintenance, be sure to consult your Toyota dealer.

If your vehicle is beyond repair because of accident or something, be sure to consult your Toyota dealer.

As sealed Nickel–Metal hydride batteries are used, be sure to consult your Toyota dealer when disposing of your vehicle.

 **CAUTION**

If you are involved in an accident, follow these precautions.

- **Move the vehicle to a safe place and perform the followings to reduce the risk of high voltage electricity leakage.**
 - **Depress the brake pedal and apply the parking brake.**
 - **Press the “P” position switch and stop the hybrid system.**
 - **If the key is inserted into key slot, remove it.**
- **If your vehicle has experienced major damage, you may get an electric shock. To prevent this, never touch the high voltage parts (hybrid battery assembly, etc.) or cables (orange color) connecting these parts. If some exposed electric wires are protruding inside or outside of the vehicle, an electric shock may also occur. Never touch them.**

- **If the fluid leaks or gets in some part of the vehicle, never touch it because it may be electrolyte (strong alkali) from the hybrid battery. If it gets on your skin or eyes, wash off immediately with a large amount of water, if possible, with boric acid solution, and get immediate medical attention in order to help avoid serious injury.**
- **If a vehicle fire occurs, extinguish it using a fire extinguisher for the exclusive use on electric fires. As a small amount of water may be dangerous, use a large amount of water, for example from a fire hydrant, or wait for a fire-fighting team arrival.**
- **If your vehicle needs to be towed, do it with the front wheels or all four wheels raised. If the front wheels are on the ground when towing, the electric motor may continue to generate electricity which could leak electricity. A fire could occur depending on the degree of damage. See “If your vehicle needs to be towed” on page 376.**

