| Enhanced VSC<br>System<br>('04 & later Prius)          | The Enhanced VSC system available on the '04 & later Prius helps<br>maintain stability when the vehicle's tires exceed their lateral grip.<br>The system helps control the vehicle by adjusting the motive force and<br>the brakes at each wheel when: |
|--|--|
|  | • The front wheels lose traction but the rear wheels don't.<br>(front wheel skid tendency known as 'understeer')   |
|  | • The rear wheels lose traction but the front wheels don't.<br>(rear wheel skid tendency, or 'oversteer')  |
|  | When the Skid Control ECU determines that the vehicle is in<br>understeer or oversteer, it decreases engine output and applies the<br>brakes to the appropriate wheels individually to control the vehicle.  |
|  | • When the skid control ECU senses understeer, it brakes the front<br>and rear inside wheel. This slows the vehicle, shifts the load to the<br>outside front wheel and limits front wheel skid.  |
|  | • When the skid control ECU senses oversteer, it brakes the front<br>and rear outside wheel. This restrains the skid and moves the<br>vehicle back toward its intended path.   |
| Cooperative Control<br>with EPS<br>('04 & later Prius) | Enhanced VSC provides the appropriate amount of steering assist<br>based on driving conditions by coordinating EPS and VSC control.  |
| Cooperative Control<br>with EPS                        |  |
|  |  |



## Electric Power Steering

A 12V motor powers the EPS system so that steering feel is not affected when the engine shuts off. The EPS ECU uses torque sensor output along with information from the Skid Control ECU about vehicle speed and torque assist demand to determine the direction and force of the power assist. It then actuates the DC motor accordingly.



**EPS ECU** The EPS ECU uses signals from the torque sensor to interpret the diver's steering intentions. It combines this information with data from other sensors regarding current vehicle conditions to determine the amount of steering assist that will be required. It can then control the current to the DC motor that provides steering assist current to the DC motor that provides steering assist.



**Power Steering** System When the steering wheel is turned, torque is transmitted to the pinion causing the input shaft to rotate. The torsion bar that links the input shaft and the pinion twists until the torque and the reaction force equalize. The torque sensor detects the twist of the torsion bar and generates an electrical signal that is proportional to the amount of torque applied to the torsion bar. The EPS ECU uses that signal to calculate the amount of power assist the DC motor should provide.

The '01-'03 Prius torque sensor is a surface-contact resistor and the '04 & later Prius uses an induction-type torque sensor.

**DC Motor** The DC motor uses a worm gear to transmit the motor's torque to the column shaft.





## Mechanism ('01-'03 Prius)

**Reduction** For '01 to '03, the reduction mechanism transmits power assist from the motor to the pinion shaft. The reduction mechanism consists of a pinion gear integrated with the motor shaft and a ring gear that is secured to the pinion shaft.

Mechanism ('04 & later Prius)

**Reduction** For '04 & later, the reduction mechanism transmits power assist from the motor to the column shaft. The reduction mechanism consists of a worm gear integrated with the motor shaft and wheel gear that is connected to the column shaft.

**Fail Safe** If the EPS ECU detects a malfunction in the EPS system, a warning light illuminates to alert the driver. The EPS ECU will store the DTC(s) and the system will power down, however the system still provides the ability to steer manually.

