Effectiveness of the Hill Start Assist Control

- Because it reduces the chance of the vehicle rolling backwards as the driver switches from the brake pedal to the accelerator pedal, it allows the driver to perform the pedal maneuver comfortably.
- Because it reduces the speed of the vehicle rolling backwards, it minimizes the wheel spin when the driver presses the accelerator pedal, thus facilitating the startoff on a slippery surface.
- Because it optimally controls the brake hydraulic pressure to the four wheels, it ensures vehicle stability without causing the wheels to lock up on slippery hills.

Description of the Hill Start Control

- The skid control ECU receives the inputs of signals from various sensors that detect the shift position and the travel direction of the vehicle body (such as by way of the wheel speed sensors, which are capable of detecting the rotational direction). Then, the system determines whether the vehicle body is rolling backwards while the driver is attempting to drive it uphill.
- The deceleration sensors detect the gradient of the hill and the acceleration state of the vehicle body. The wheel speed sensors detect the locking state of the wheels and their rotational direction. Then, the skid control ECU calculates the amount of control that is needed and implements brake hydraulic pressure control to the wheels.
- When the vehicle starts to move forward, the system releases the brake hydraulic pressure and stops the control.

Precautions for Hill Start Assist Control

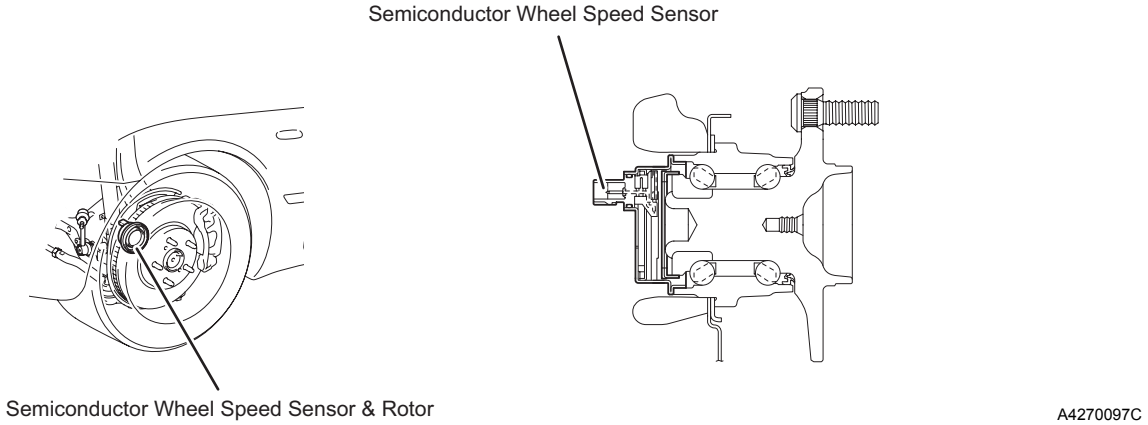
- The hill start assist control is not a function for keeping the vehicle stopped on a hill.
- During a hill start assist control operation, the slip indicator light blinks in the combination meter, and the brake lights illuminate.
- The hill start assist control system controls the brakes at four wheels to reduce the reverse movement of the vehicle. However, it might not be fully effective on extremely steep slopes or on icy roads or other surfaces with very low friction.

Radar Cruise Control Brake Operation

- If a greater deceleration rate is required while driving in the vehicle control mode, this control generates a brake force by controlling the brake hydraulic pressure in accordance with the signals received from the distance control ECU.

Front Wheel Speed Sensor

- A semiconductor wheel speed sensor & magnetic rotor, which is integrated in the bearing unit, is installed on the front axle hub. The magnetic rotor is fixed to the inner race of the bearing unit and the sensor is installed on the cap.



Detection Principle

- The magnetic rotor consists of a rubber matrix embedded with magnetic particles, with N/S poles (48 N and S poles each) arranged uniformly in the circumferential direction.
- The rotational movement of the magnetic rotor causes the magnetic field to change. The active sensor detects the changes and outputs them in the form of wheel speed pulses.
- In contrast to the widely used passive sensors, this sensor is able to detect vehicle speeds starting from approximately 0 km/h. In addition, because it can detect the rotational direction of the rotor, it enables the system to differentiate between the forward and reverse movement of the vehicle.