

VSC Function

- The primary purpose of the ABS and TRC systems is to ensure stability during the braking and acceleration associated with brake or accelerator maneuvers. In contrast, the VSC (Vehicle Stability Control) system ensures stability in the turning direction of the vehicle. Ordinarily, a vehicle turns stably in accordance with the steering maneuver. However, under unexpected conditions or external factors, such as surface conditions, vehicle speed, or emergency turning, the vehicle will exhibit a strong sideslip tendency at the front or rear wheels. To ensure stability under these conditions, the VSC automatically controls the engine power output and the brakes at the individual wheels in order to ease the strong sideslip tendency at the front or rear wheels.

Control Performance Outline

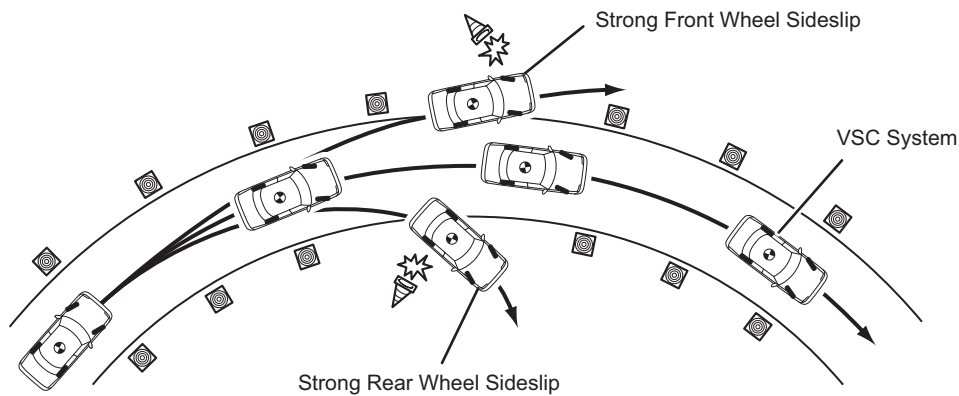
- The VSC detects the conditions of the vehicle based on the signals received from various sensors including the yaw rate sensor and deceleration sensor, and controls the brake hydraulic pressure and the engine output torque.
- The following are two examples of circumstances in which the wheels exceed their side grip threshold:

Two Examples:

[1] The rear wheels are losing their grip relative to the front wheels (strong rear wheel sideslip).
--

[2] The front wheels are losing their grip relative to the rear wheels (strong front wheel sideslip).

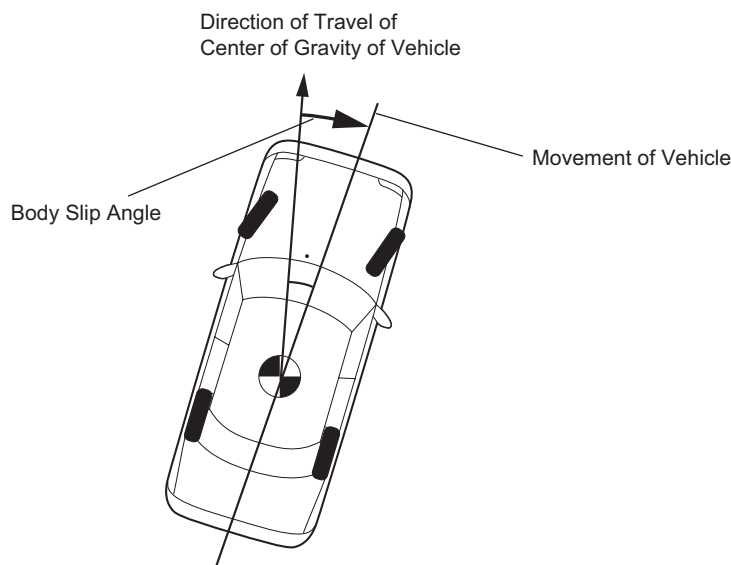
- The VSC operates in the circumstances illustrated below to ease the vehicle's strong rear or front wheel sideslip tendency.



A4270090C

Judging the Vehicle's Strong Rear Wheel Sideslip Tendency

- The skid control ECU determines whether a rear wheel sideslip tendency exists based on the body slip angle and slip angle velocity values obtained by the yaw rate & deceleration sensor. When both the body slip angle and the slip angle velocity are large, the body is said to exhibit a rear wheel sideslip tendency.

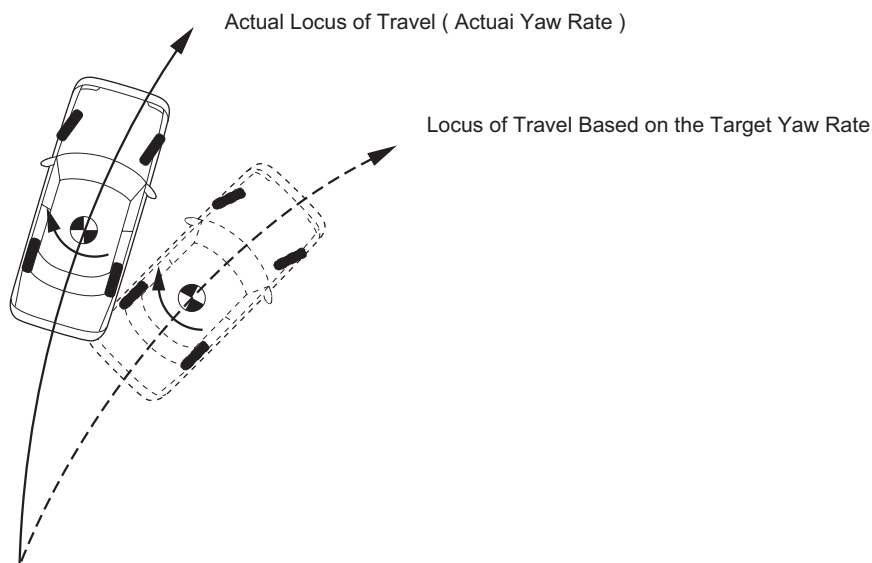


A4270091C

BR

Judging the Vehicle's Strong Front Wheel Sideslip Tendency

- The skid control ECU determines whether a front wheel sideslip tendency exists based on a comparison of the target yaw rate and the vehicle's actual yaw rate value. As the driver turns the steering wheel, if the vehicle's actual yaw rate is lower than the target yaw rate that should be generated (determined by the steering angle and vehicle speed), it means that the body is not turning as intended. Thus, the body is said to exhibit a large front wheel sideslip tendency.



A4270092C

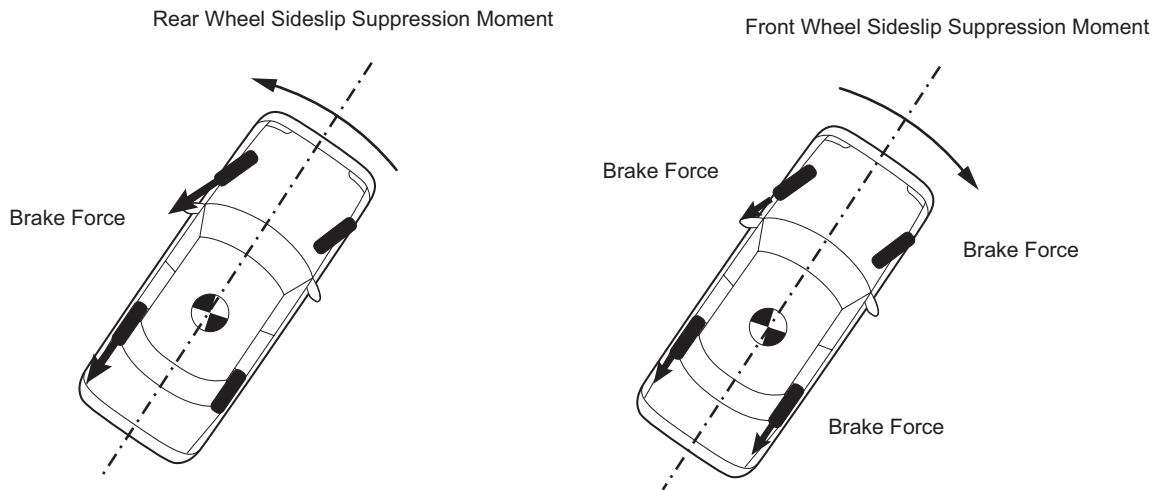
VSC Operation Method

- Easing a Strong Rear Wheel Sideslip Tendency of the Vehicle

When the skid control ECU judges that the vehicle exhibits a large rear wheel sideslip tendency, it applies the brakes on the front and rear wheels on the outside of the turn in accordance with the extent of that tendency. This suppresses the rear wheel sideslip tendency by generating a moment outward of the vehicle. In addition, the vehicle speed that is reduced by the application of the brake force also contributes to ensuring vehicle stability.

- Easing a Strong Front Wheel Sideslip Tendency of the Vehicle

When the skid control ECU judges that the vehicle exhibits a large front wheel sideslip tendency, it controls the engine power output in accordance with the extent of that tendency. Then, the skid control ECU applies the brakes on the front and rear wheels to reduce the side force, in order to suppress the front wheel sideslip tendency.



Making a Right Turn

A4270093C