

SYSTEM DESCRIPTION

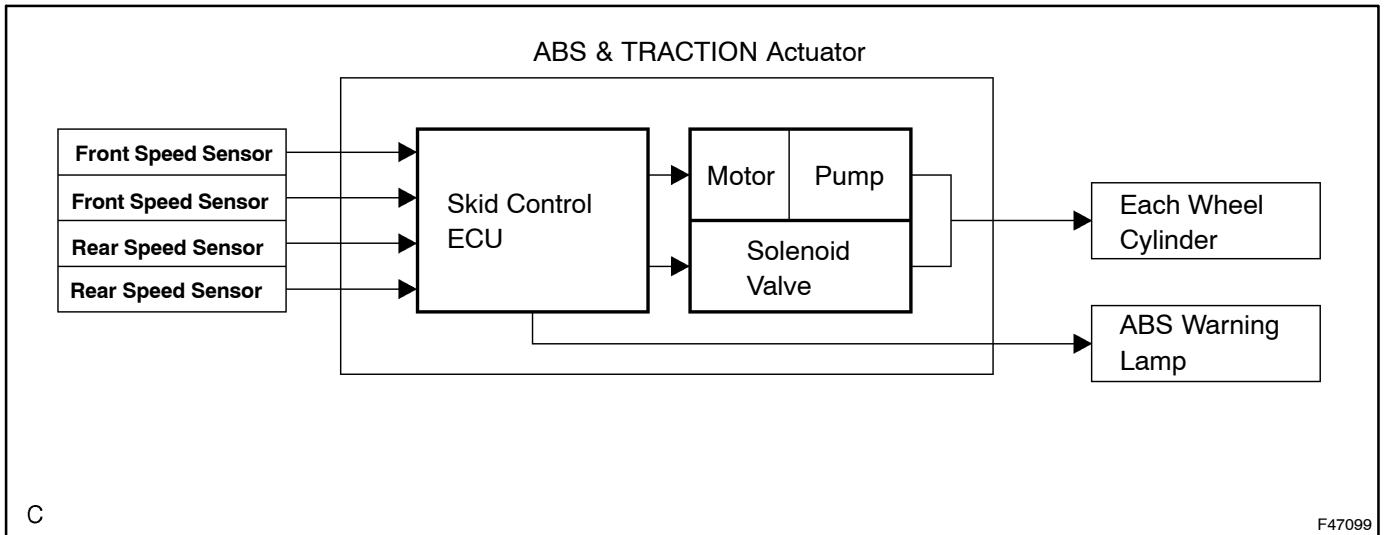
1. SYSTEM DESCRIPTION

HINT:

- The skid control ECU is a single unit with ABS & TRACTION ACTUATOR.
- The skid control ECU also works as a TPMS (Tire Pressure Monitor System) ECU.
- The yaw rate sensor and deceleration sensor are combined and in a single unit. This unit communicates with the skid control ECU through CAN communication.

(a) ABS(Anti-lock Brake System)

The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.



Operation description

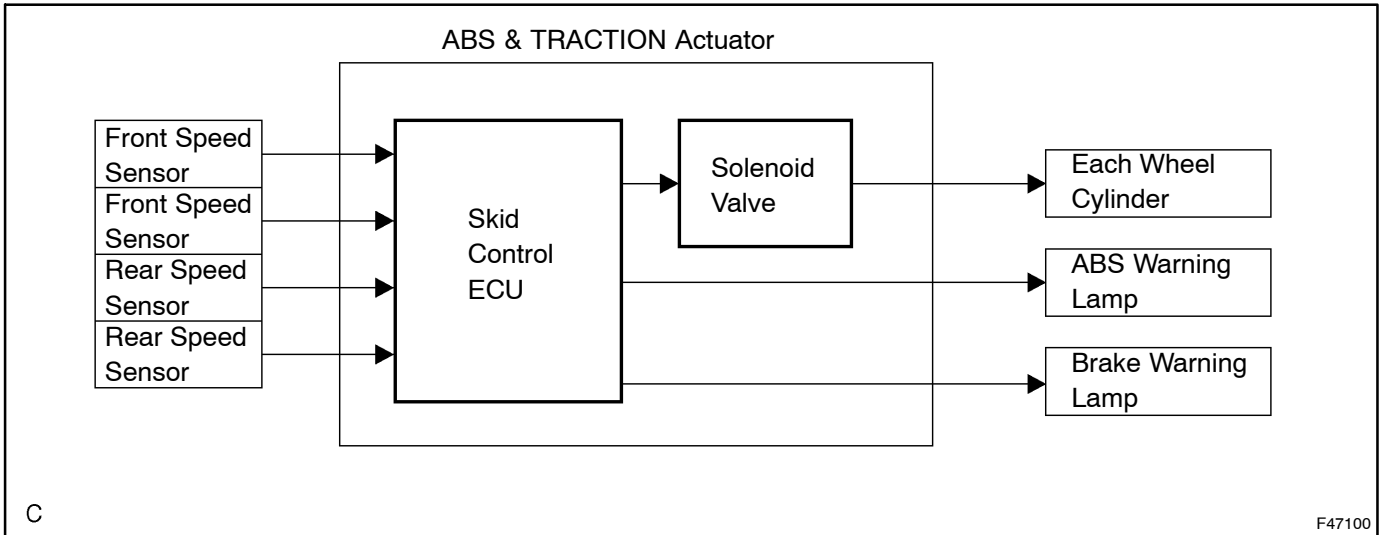
The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the oil pressure of each wheel cylinder.

The ABS warning lamp comes on when the ABS system is malfunctioning.

(b) EBD (Electronic Brake force Distribution)

The EBD control utilizes ABS, realizing proper brake force distribution between front and rear wheels in accordance with driving conditions.

In addition, during cornering braking, it also controls the brake forces of the right and left wheels, helping to maintain vehicle behavior.

**Operation description**

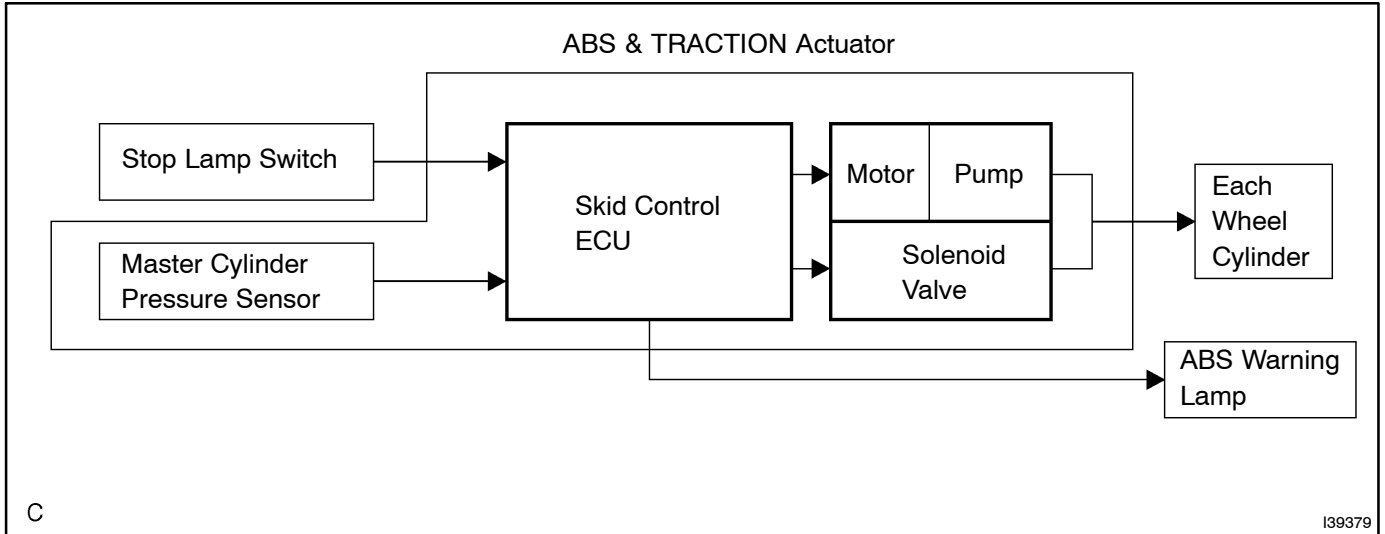
The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

The solenoid valve controls the oil pressure of each wheel cylinder and splits the control power properly between the front and rear wheels and the right and rear wheels.

Both of the ABS warning lamp and the brake warning lamp come on to indicate a malfunction in the EBD system.

(c) BA (Brake Assist)

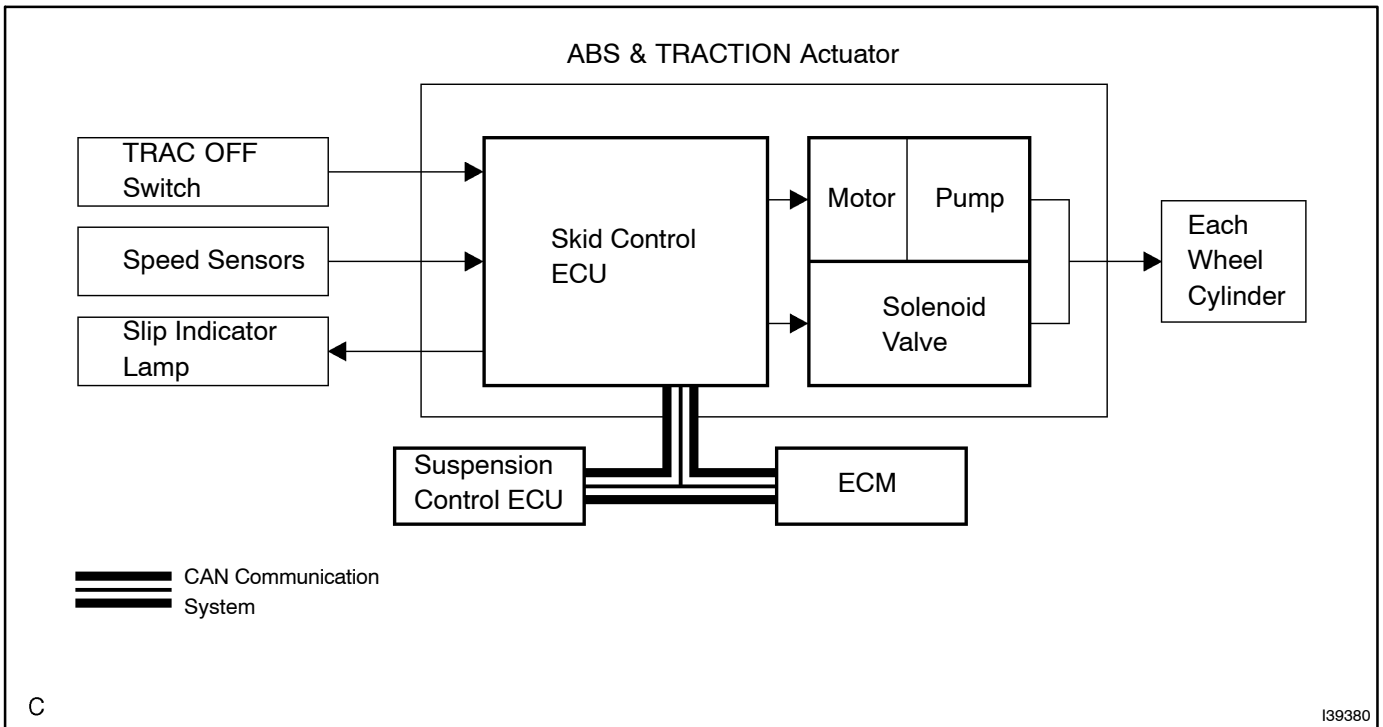
The primary purpose of the brake assist system is to provide an auxiliary brake force to assist the driver who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle's brake performance.

**Operation description**

The skid control ECU receives the signal from the stop lamp switch and the oil pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary or not. If brake assist is deemed necessary, the ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder. The ABS warning lamp comes on to indicate a malfunction in the brake assist system.

(d) TRAC (Traction Control)

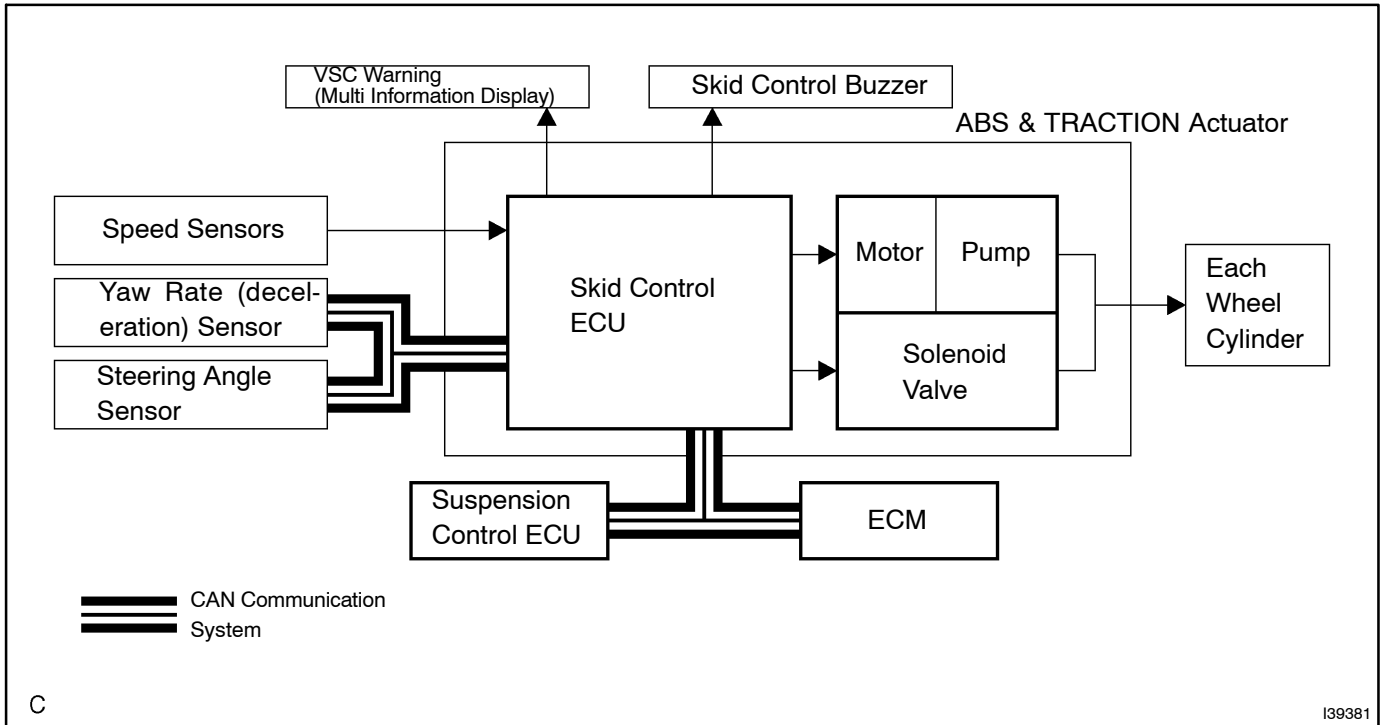
The TRAC system helps prevent the drive wheels from slipping if the driver presses down on the accelerator pedal excessively when starting off or accelerating on a slippery surface.

**Operation description**

The skid control ECU detects vehicle's slip condition by receiving signals from the speed sensor and ECM via CAN communication. The skid control ECU controls engine torque with the ECM, vehicle position with suspension control ECU via CAN communication, and oil pressure with the pump and solenoid valve. The SLIP indicator lamp blinks when the system is operating. TRAC OFF switch stops traction control operation.

(e) VSC (Vehicle Stability Control)

The VSC system helps prevent the vehicle from slipping sideways as a result of strong front wheel skid or strong rear wheel skid during cornering.

**Operation description**

The skid control ECU determines vehicle condition by receiving signals from the speed sensor, yaw rate and deceleration sensor and steering angle sensor. The skid control ECU controls engine torque with the ECM, vehicle position with suspension control ECU via CAN communication, and oil pressure with the pump and solenoid valve. The warning light comes on and the buzzer sounds when the system is operating.

2. ABS with EBD & BA & TRAC & VSC OPERATION

- Skid control ECU calculates vehicle stability tendency based on the signal of sensors, speed sensor, yaw rate and deceleration sensor and steering angle sensor. And it judges whether the control of engine output torque by electronic control throttle and of wheel brake pressure by brake actuator will operate or not by the calculation results.
- The SLIP indicator blinks and the VSC buzzer sounds to inform the driver that the VSC system is operating. The SLIP indicator also blinks when TRAC is operating, and the operation being performed is displayed.

3. FAIL SAFE FUNCTION

- When a failure occurs in the ABS with BA & TRAC & VSC systems, the ABS warning light and the VSC warning light turns on and the ABS with BA & TRAC & VSC operations are prohibited. In addition to this, when there is a failure that disables the EBD operation, the brake warning light also comes on and the EBD operation is prohibited (see page 05-492).
- If some control is prohibited due to a malfunction during its operation, that control will be cut off gradually not to change stability of vehicle suddenly.

4. PRE-COLLISION BRAKE ASSIST SYSTEM (w/ PRE-COLLISION BRAKE ASSIST SYSTEM)

If a collision (front collision) is determined to be unavoidable, the pre-collision brake assist system receives the brake assist standby signal from the distance control ECU and enters brake assist standby mode. If the STP signal is input, the pre-collision brake assist system improves deceleration performance by increasing pressure according to the amount of brake pedal effort.