05NC2–01

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

- The skid control ECU is a single unit with hydraulic brake booster.
- The yaw rate and deceleration sensors are combined and in a single unit. This unit communicates with the skid control ECU through CAN communication.

(a) ABS with EBD & BA & TRC & VSC operation

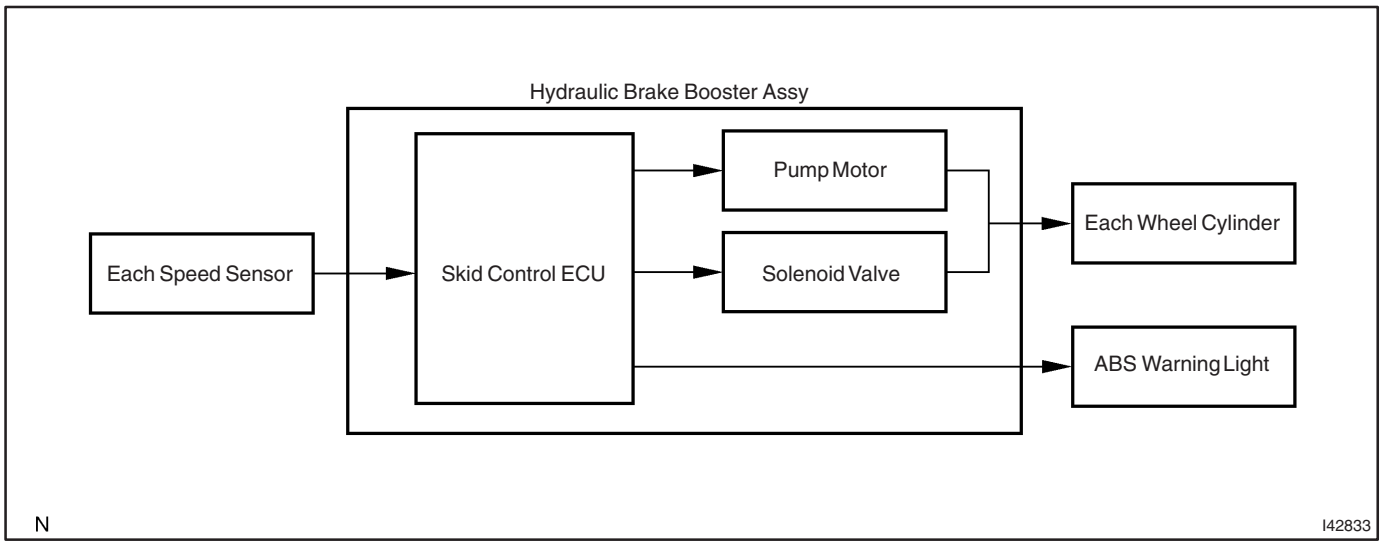
(1) The skid control ECU calculates vehicle stability tendency based on the signals from the speed sensor, yaw rate and deceleration sensor and steering angle sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and of the wheel brake pressure by the brake actuator) should be implemented.

(2) The slip indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The slip indicator also blinks when TRC is operating, and the operation being performed is displayed.

2. ACTIVE SAFETY

(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

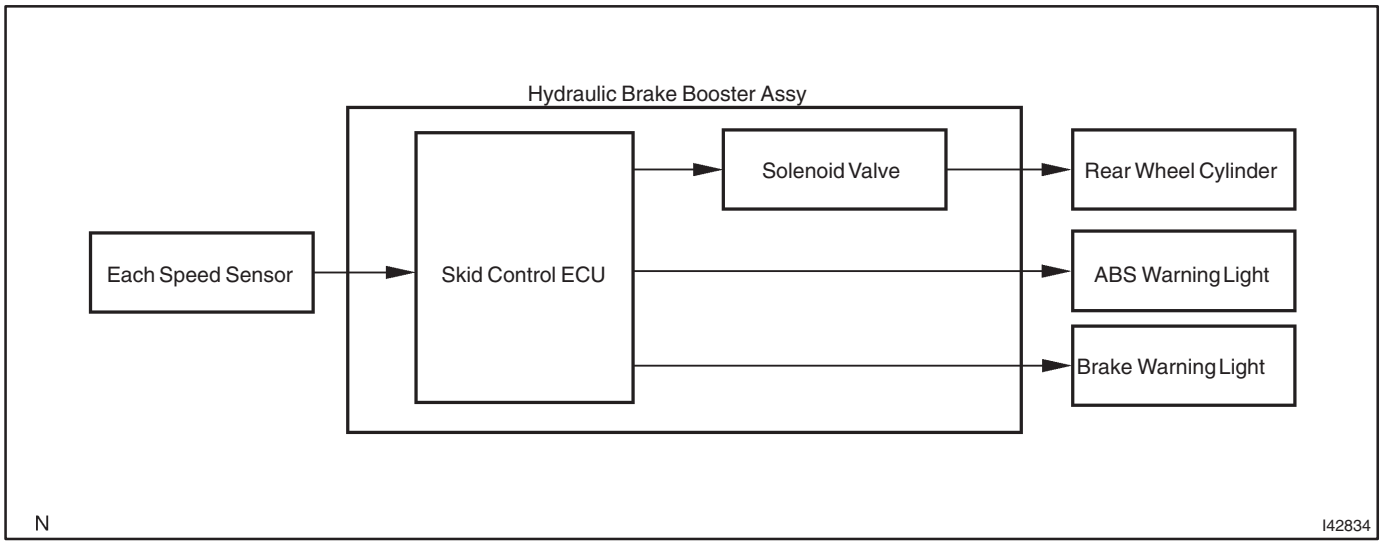
The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the oil pressure of each wheel cylinder.

The ABS warning light 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 the front and rear wheels in accordance with driving conditions.

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



Operation description

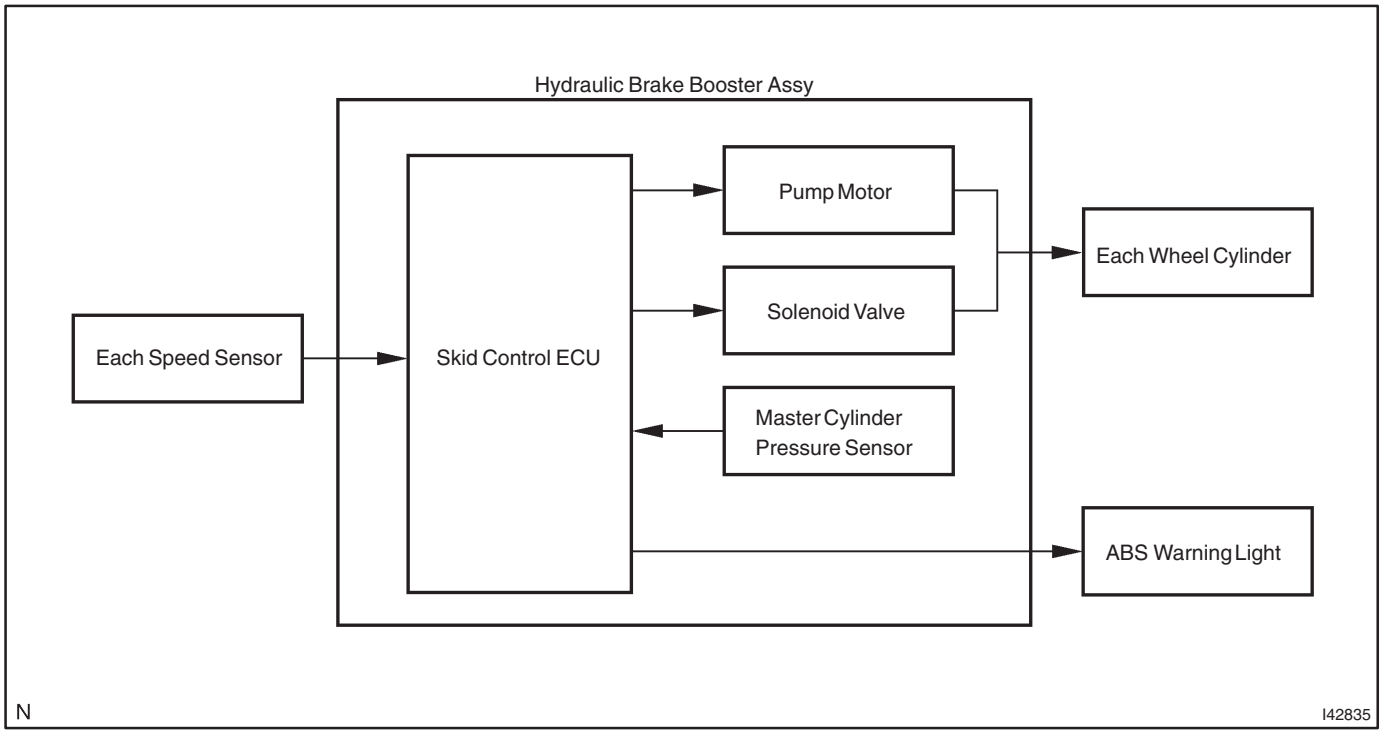
The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

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

Both of the ABS and brake warning lights 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 braking performance.



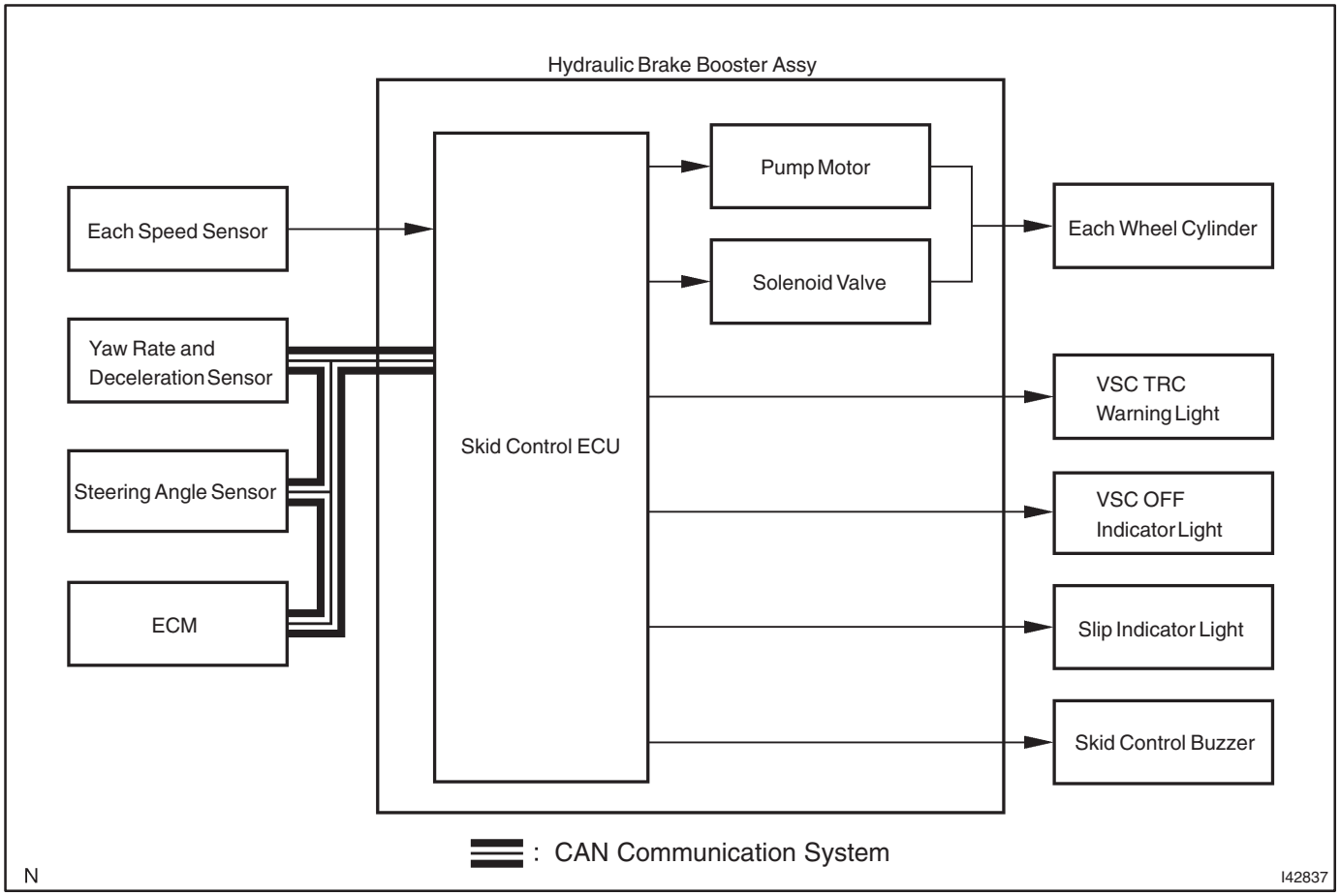
Operation description

The skid control ECU receives the speed signal from each speed sensor 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 light comes on to indicate a malfunction in the BA system.

(d) 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

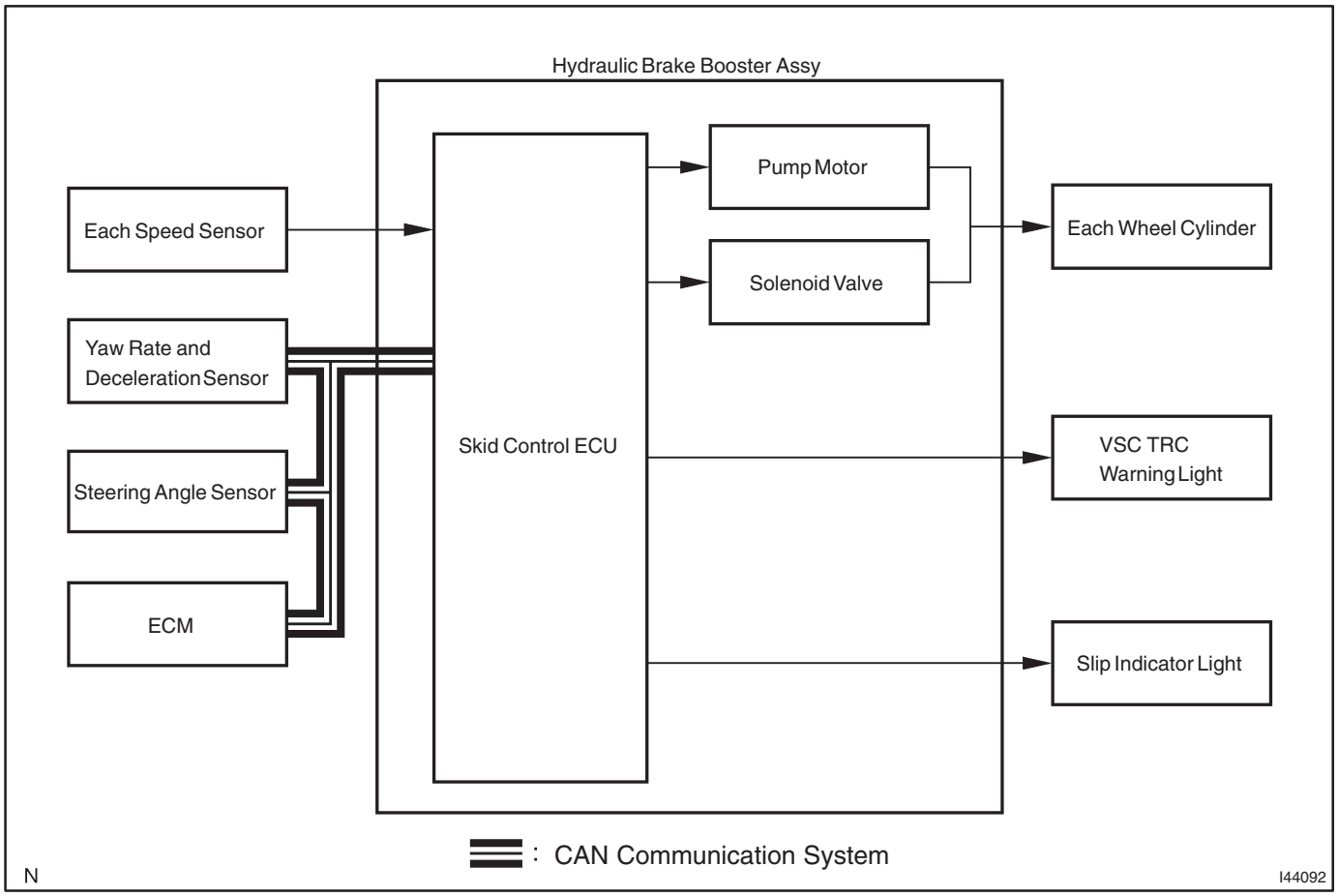
The skid control ECU determines vehicle condition by receiving signals from the speed sensor, yaw rate and deceleration sensor and steering angle sensor. The skid control ECU controls engine torque through the ECM via CAN communication, and oil pressure through the pump and solenoid valve.

The slip indicator light blinks and the skid control buzzer sounds when the system is operating. Both of the VSC TRC warning light and the VSC OFF indicator light come on to indicate a malfunction in the VSC system.

3. DRIVING PERFORMANCE

(a) TRC (Traction Control)

The TRC 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.



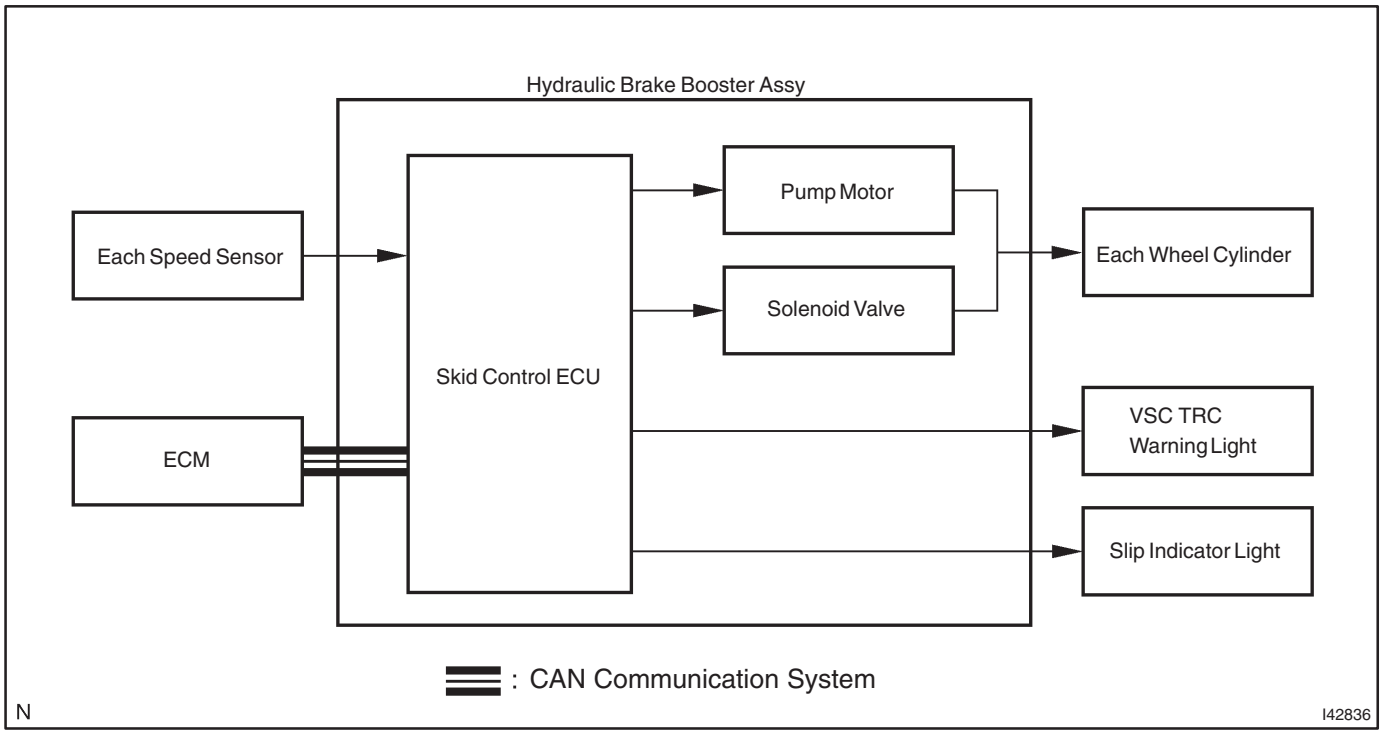
Operation description

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 through the ECM via CAN communication, and oil pressure through the pump and solenoid valve.

The slip indicator light blinks when the system is operating. Both of the VSC TRC warning light and slip indicator light come on to indicate a malfunction in the TRC system.

(b) A–TRC (Active Traction Control)

During rugged offroad driving, this function controls the engine output and the brake fluid pressure that is applied to the slipping wheel, and distributes the drive force that would have been lost through the slippage to the remaining wheels in order to achieve an LSD (Limited Slip Differential) effect. As a result, the vehicle's offroad drivability and ability to free itself from the mogul have been increased.

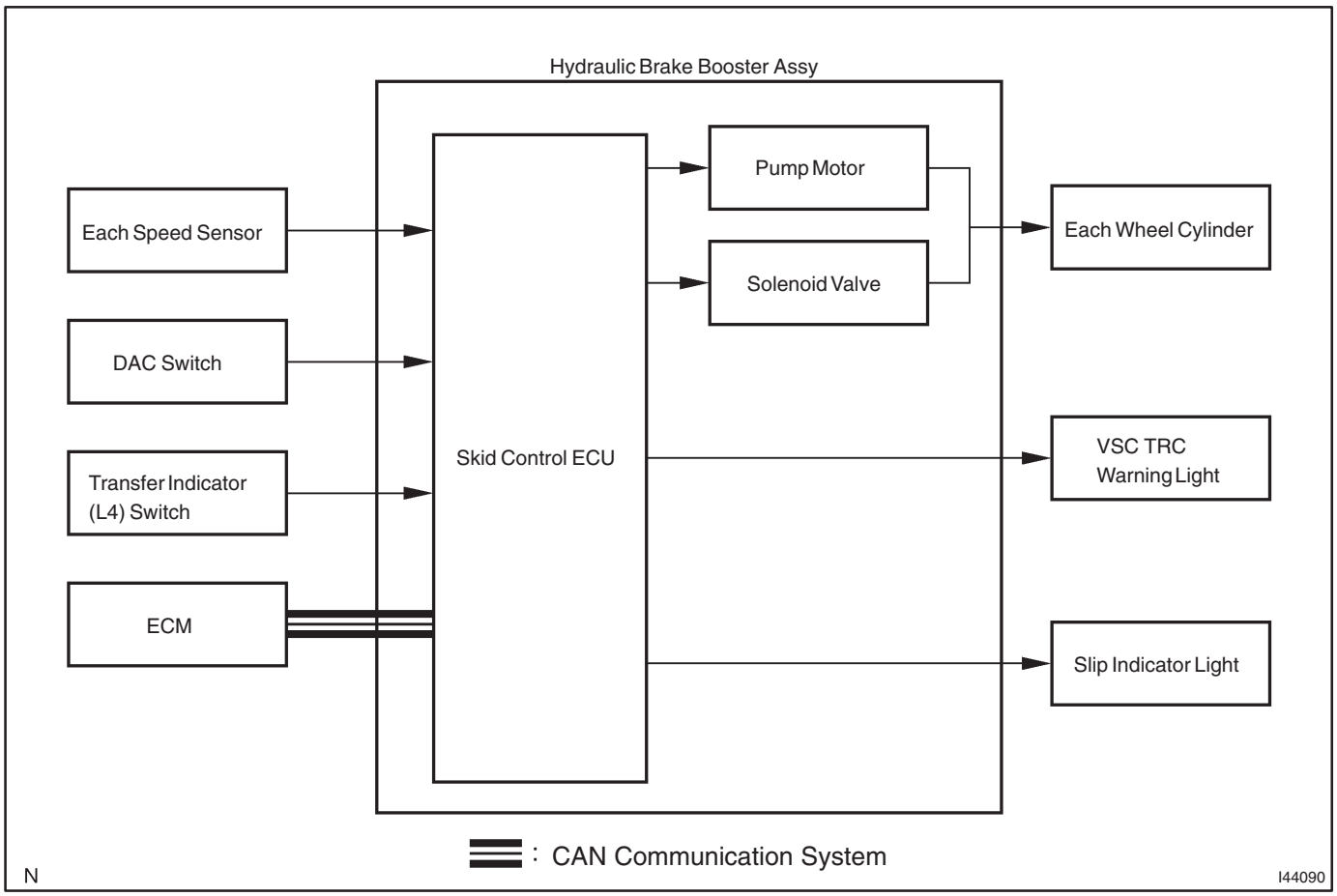


Operation description

The slip indicator light blinks when the system is operating. Both of the VSC TRC warning light and slip indicator light come on to indicate a malfunction in the A–TRC system.

(c) DAC (Downhill Assist Control) (Automatic Transaxle)
When the DAC switch is pressed with transfer in low (L4) range and without accelerator and brake pedals operation, DAC activates to effect 4–wheel hydraulic pressure control, in order to maintain a constant low vehicle speed without causing the wheels to become locked. Thus, the vehicle can descend a steep hill in a stable manner.

HINT:
Depressing the accelerator and brake pedal cancels control of the DAC system.
Begins operating when driving down on a slope at a speed of 16 mph (25 km/h) or less with the engine brake applied.



Operation description
The slip indicator light blinks and the DAC indicator light and brake light come on when the system is in operation.
The VSC TRC warning light comes on and the DAC indicator light blinks to indicate a malfunction in the DAC system.

(d) HAC (Hill–start Assist Control) (Automatic Transaxle)

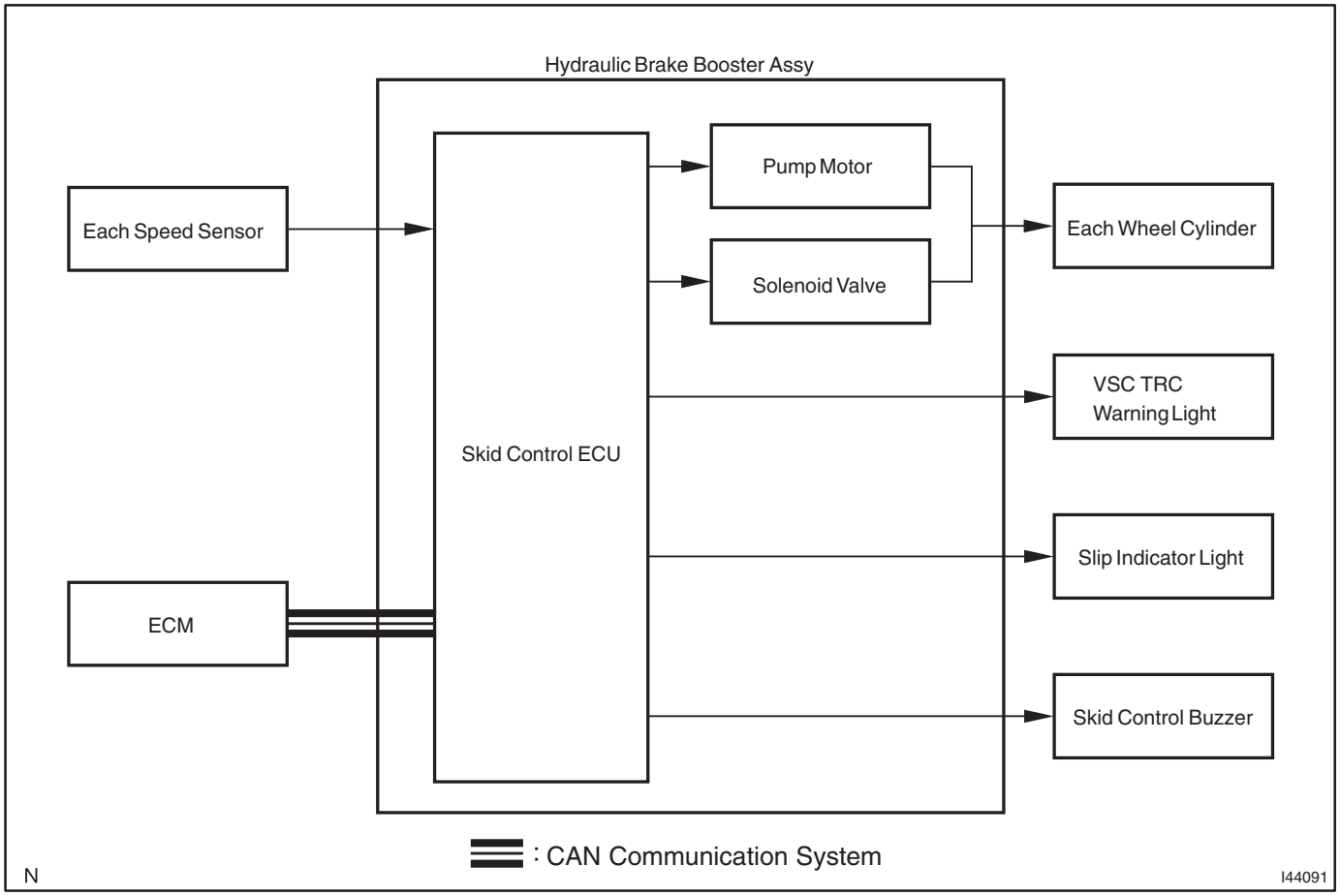
When the vehicle starts off on a steep hill, HAC detects the backward descent of the vehicle and effects 4–wheel hydraulic pressure control to reduce the backward speed of the vehicle.

Maximum 5 seconds after the control has started, fluid pressure is gradually released and control will be complete.

HINT:

Depressing the brake pedal cancels control of the HAC system.

Does not operate when the shift lever is in the P or N position, or when the vehicle is running/rolling back up a slope with the shift lever in the R position.



Operation description

The slip indicator light blinks, the brake light comes on, and the skid control buzzer sounds when the system is in operation.

The VSC TRC warning light comes on when the HAC system is malfunctioning.