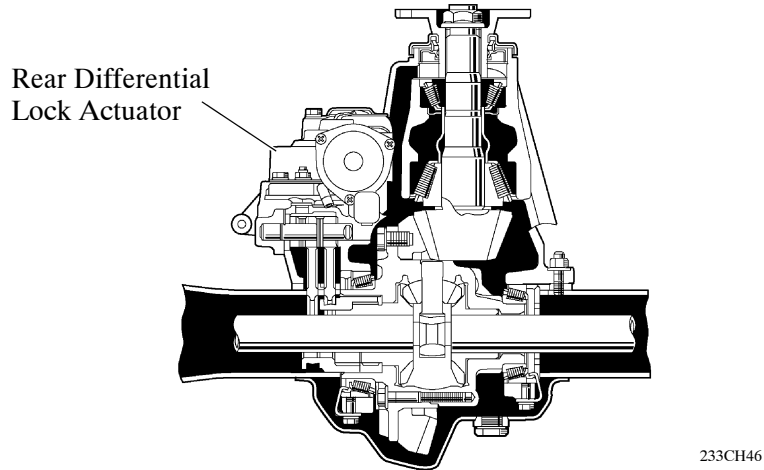


NEW FEATURES

■ DIFFERENTIAL (OFF-ROAD PACKAGE MODELS)

1. General

The following rear differential is provided for the off-road package models.



BD20B Type
(With Rear Differential Lock Actuator)

► Specifications ◀

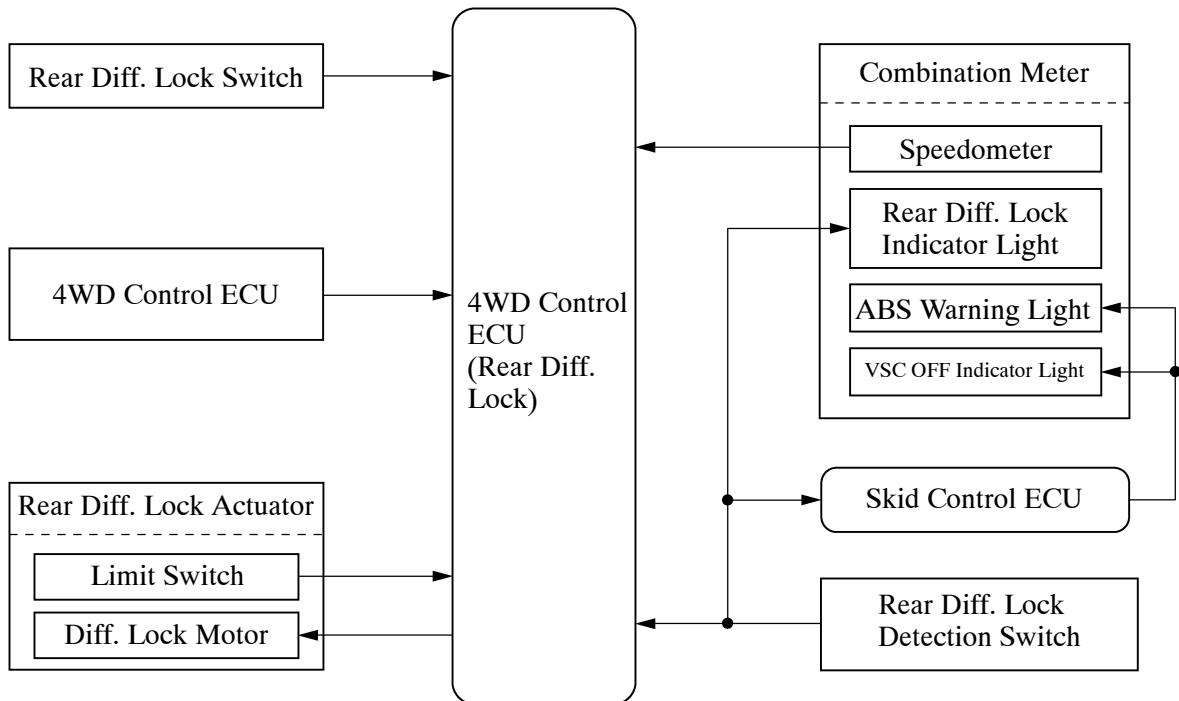
Rear Differential Type	BD20B (with Differential Lock Actuator)	
Differential Gear Ratio	3.727	
Ring Gear Size	mm (in.)	205 (8.0)
Oil Capacity	Liters (US qts, Imp. qts)	2.95 (3.12, 2.60)
Oil Viscosity	SAE75W-80	
Oil Grade	API GL-5	
Oil Type	Toyota Genuine Differential Gear Oil LT	
Weight (Reference)	kg (lb)	29.6 (65.3)

2. Rear Differential Lock System

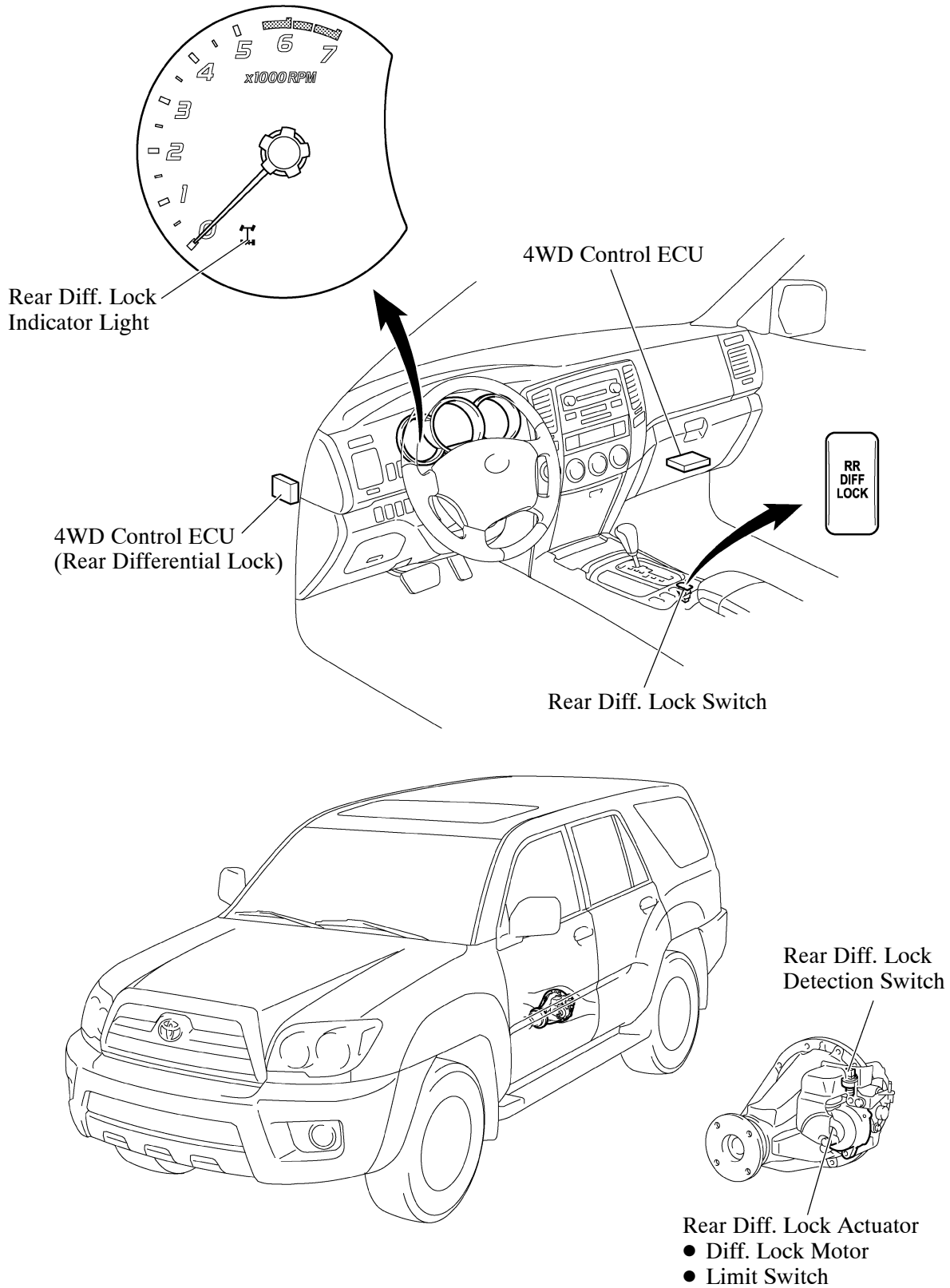
General

The sliding of the differential lock sleeve is accomplished by a rear differential lock actuator, which is controlled by the 4WD control ECU (rear differential lock) in conformity with the signals from the rear differential lock switch and from other signals.

► System Diagram ◀



Layout of Main Components



System Operation

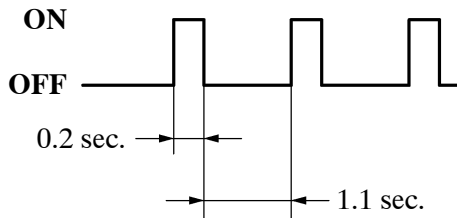
The table below shows how the 4WD control ECU (rear differential lock) controls the rear differential lock actuator and rear differential lock indicator light based on the ECU signals received from the switches and signals depending on the operation of the rear differential lock switch.

► Operation Condition ◀

Switches and Signal Condition				Rear Diff. Condition	Rear Diff. Lock Indicator Light
Rear Diff. Lock Switch	4WD Control Switch	Vehicle Speed	Rear Diff. Lock Detection Switch		
OFF	OFF	—	OFF	Free	OFF
ON	OFF	—	OFF	Free	Blink 1
ON	ON	8 km/h (5 mph) or Higher	OFF	Free	Blink 1*
ON	ON	8 km/h (5 mph) or Lower	OFF	Rear Diff. Lock Actuator is Operating	Blink 2
ON	ON	8 km/h (5 mph) or Lower	ON	Lock	ON

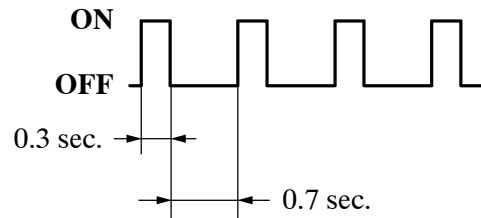
*: When the vehicle speed is higher than 8 km/h (5 mph), the 4WD control ECU (rear differential lock) prohibits shifting in the “LOCK” mode, and blinks the rear differential lock indicator light.

► Rear Differential Lock Indicator Light Blinking Pattern ◀



Blink 1

233CH50



Blink 2

233CH51

— REFERENCE —

When the rear differential lock is in operation, the skid control ECU stops the operation of the brake control system (except EBD and A-TRAC functions) and turns on the ABS warning light and VSC OFF indicator light.

■ BRAKE CONTROL SYSTEM (OFF-ROAD PACKAGE MODELS)

1. General

The brake control system for off-road package models has the following functions:

Function	Outline
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.
EBD (Electronic Brake force Distribution)	The EBD control utilizes the ABS, achieving the proper brake force distribution between the front and rear wheels in accordance with the driving conditions. In addition, during braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain the vehicle behavior.
Brake Assist	The primary purpose of brake assist is to provide an auxiliary brake force to assist the driver when a large enough brake force cannot be generated during emergency braking, thus helping improve the vehicle's braking performance.
Auto LSD (Limited Slip Differential)	When the VSC OFF switch is turned on, the Auto LSD system operates. The Auto LSD system achieves a function equivalent to that of an LSD system through the use of the TRAC. The Auto LSD applies brake hydraulic pressure to a slipping wheel to reduce the difference in rotation speed between the left and right drive wheels. This causes driving torque to be transmitted to the wheel opposite the slipping wheel.
TRAC (Traction Control)	TRAC helps prevent the drive wheels from slipping if the driver presses the accelerator pedal excessively when starting off or accelerating on a slippery surface.
A-TRAC (Active Traction Control)	The A-TRAC operates when the A-TRAC switch is turned on with the drive mode in L4L. A-TRAC controls the brake hydraulic 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 effect.
VSC (Vehicle Stability Control)	The VSC helps prevent the vehicle from slipping sideways as a result a of strong front wheel skid or strong rear wheel skid during cornering.

2. Drive Modes and Each Function

Each drive mode has controllable brake control functions as follows:

○: Operational —: Non-operational

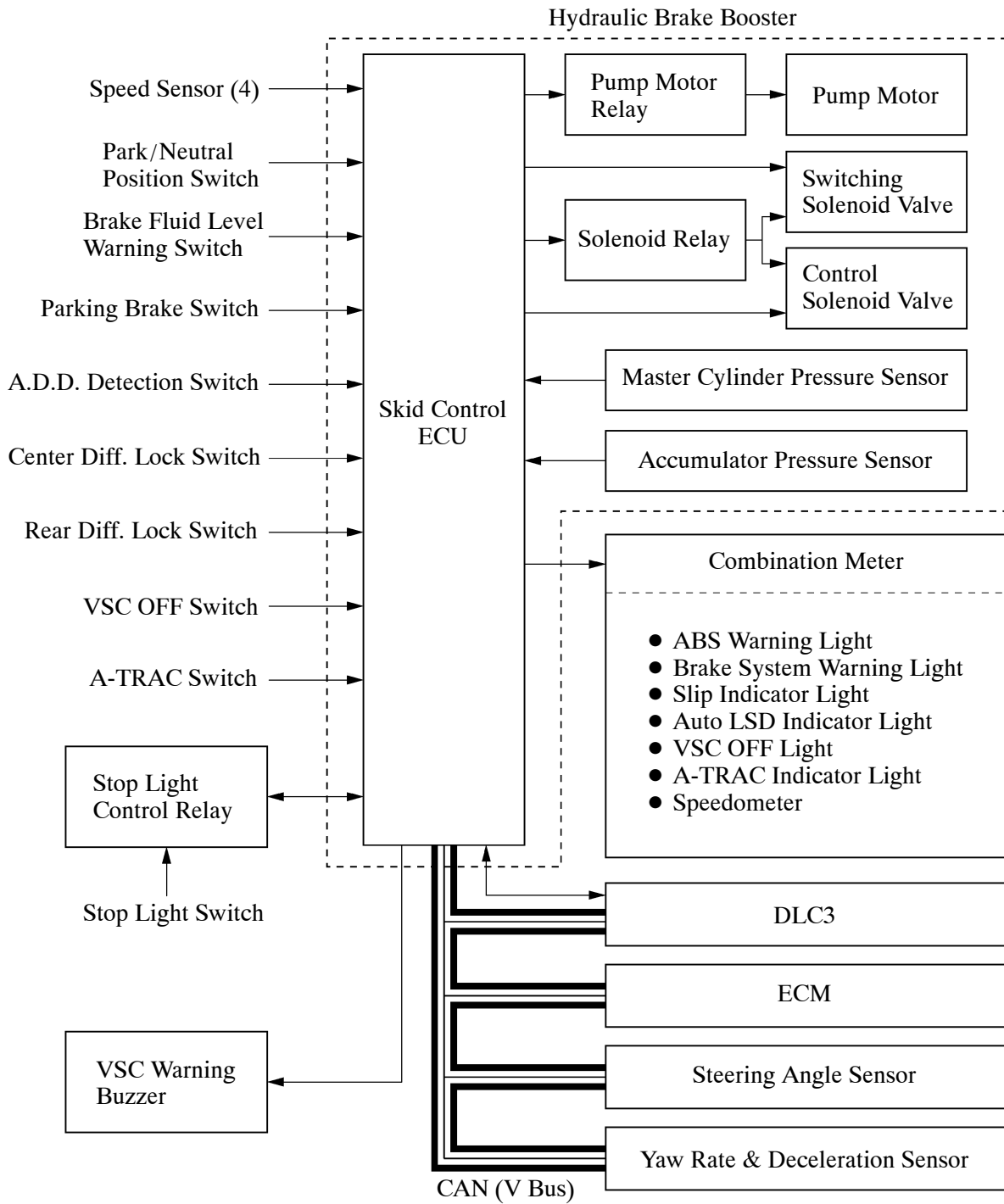
Drive Mode		Brake Control Function						
		ABS	EBD	Brake Assist	Auto LSD	TRAC	A-TRAC	VSC
H2		○	○	○	○	○	—	○
H4F		○	○	○	—	○	—	○
H4L		○	○	○	—	○*1	—	—
L4F		○	○	○	—	○*1	—	○*1
L4L	Rear Diff. Free	○	○	○	—	—	○*2	—
	Rear Diff. Lock	—	○	—	—	—	○*3	—

*1: Hydraulic pressure control only (engine output control does not operate).

*2: A-TRAC switch is turned on.

*3: A-TRAC switch is turned on and vehicle speed 6 km/h (3.7 mph) or less.

3. System Diagram

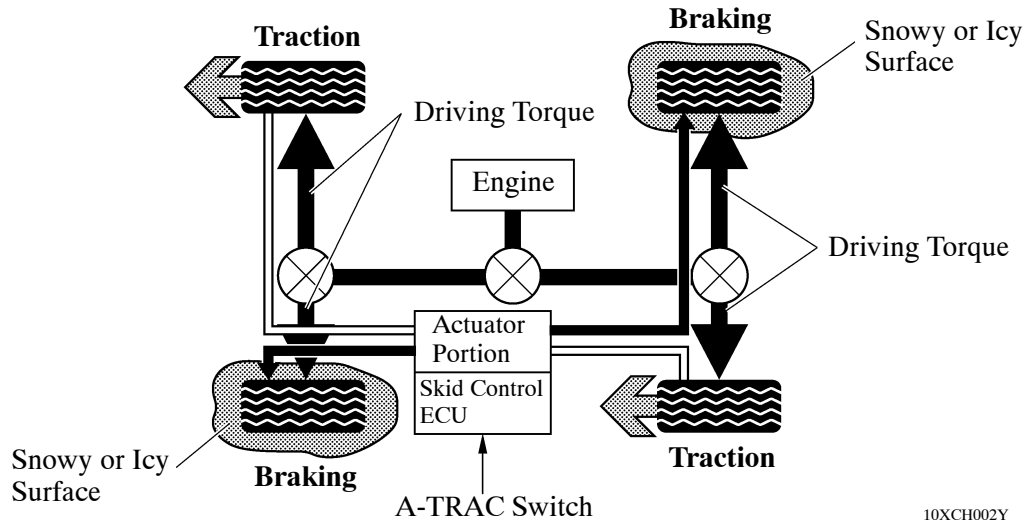


4. Outline of A-TRAC

When the drive mode is L4L and the A-TRAC switch is turned on, the A-TRAC helps restrain wheelspin by controlling the brake fluid pressure that is applied to the spinning wheels, and distributes the drive force that would have been lost through slippage to the remaining wheels in order to achieve an effect that is similar to LSD.

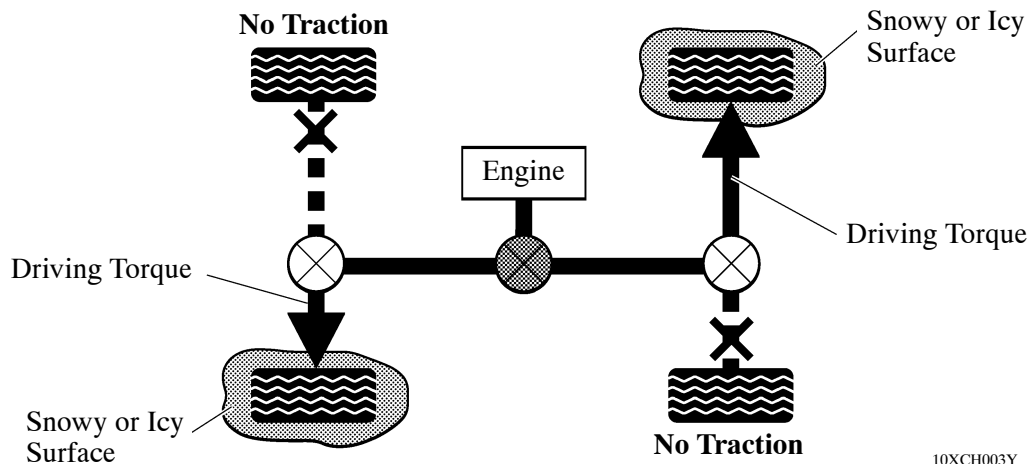
- The A-TRAC independently controls the brake hydraulic pressure to the four wheels in accordance with the extent of slippage at the wheels, as detected by the skid control ECU.

► With A-TRAC ◀



10XCH002Y

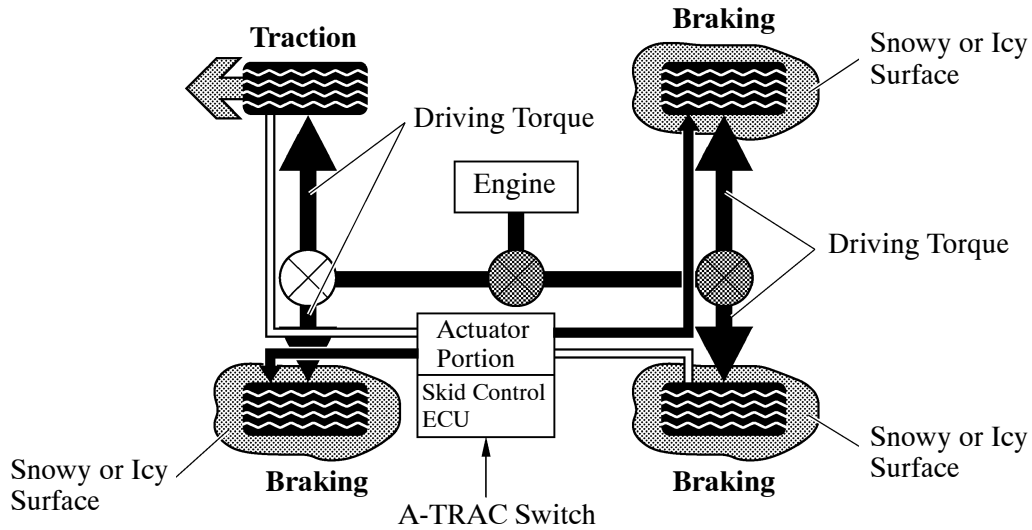
► Without A-TRAC ◀



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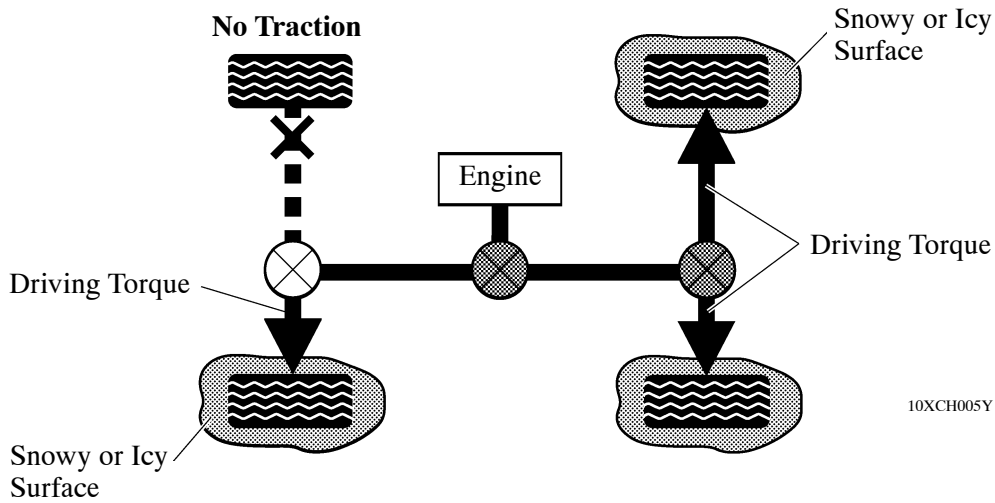
- In addition, using the A-TRAC in combination with the rear differential lock system increases the vehicle's ability to free itself from obstructions.

► With A-TRAC and Rear Differential Lock ◄



10XCH004Y

► With Rear Differential Lock ◄



10XCH005Y

5. Layout of Main Components

