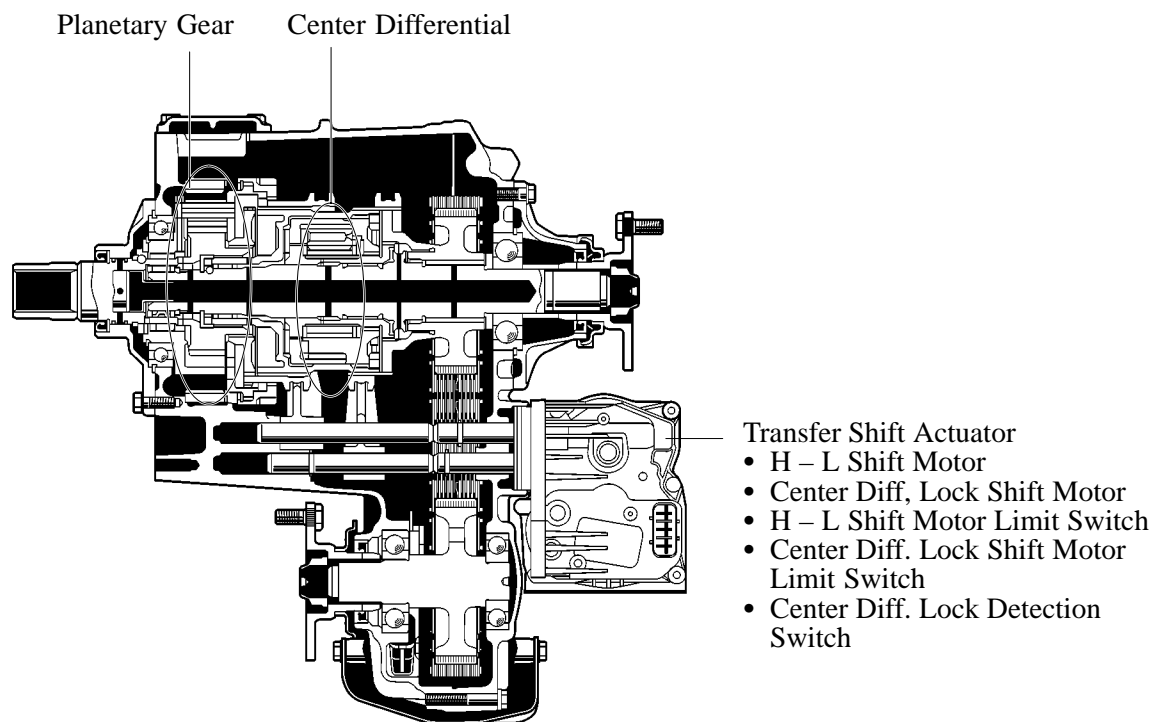


■ CONSTRUCTION

1. General

The construction of the transfer is shown below.

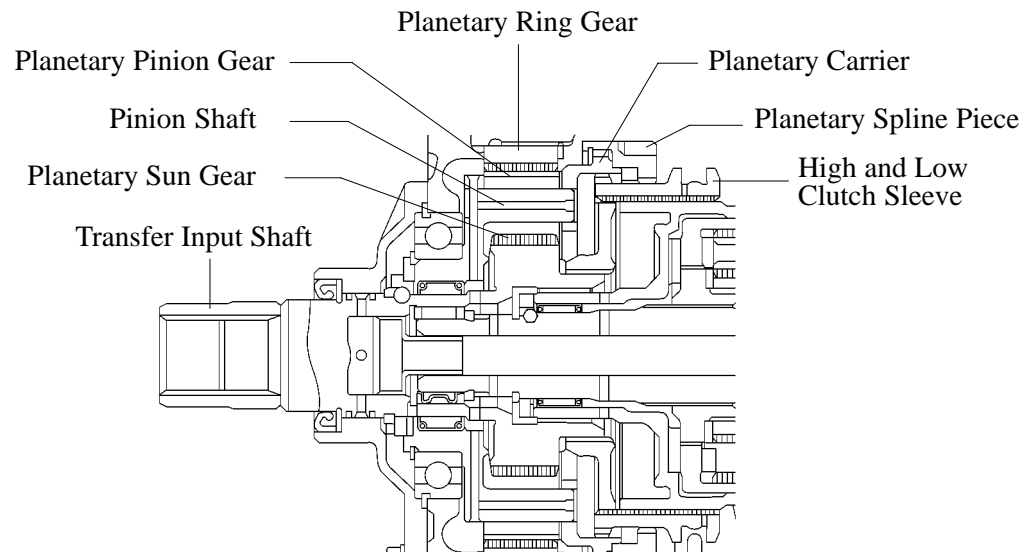
- The construction of the planetary gears is the same as the VF3AM transfer on the '02 4Runner.
- The center differential uses a TORSEN LSD.
- The transfer shift actuator, which contains H - L shift motor, center diff. lock shift motor, H - L shift motor limit switch, center diff. lock shift motor limit switch and center differential lock detection switch, cannot be disassembled.



2. Planetary Gear

General

- The planetary sun gear integrates with the transfer input shaft.
- 4 planetary pinion gears are fitted to the planetary carrier. Each pinion gear shaft is fixed to the planetary carrier. A planetary spline piece is fitted to the rear of the planetary carrier and internal gear teeth of the planetary spline piece can be engaged with the external teeth of the low and high clutch sleeve. At the rear of the transfer input shaft, a high and low clutch sleeve is installed on the output shaft.
- The planetary ring gear is fixed to the transfer case and internal teeth are meshed with the planetary pinion gear.

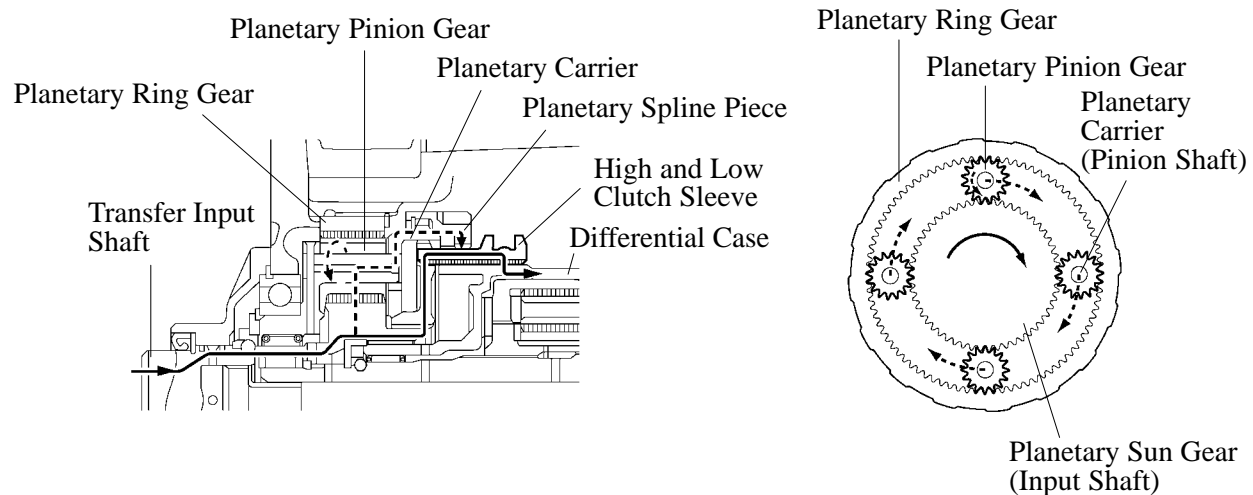


232CH156

H Position

In the H position, the splines at the rear of the transfer input shaft mesh with the internal gear teeth of the high and low clutch sleeve.

Also, the high and low clutch sleeve is meshed to the differential case of TORSEN LSD. Thus, the rotation of the input shaft is transmitted to the high and low clutch sleeve, the differential case.

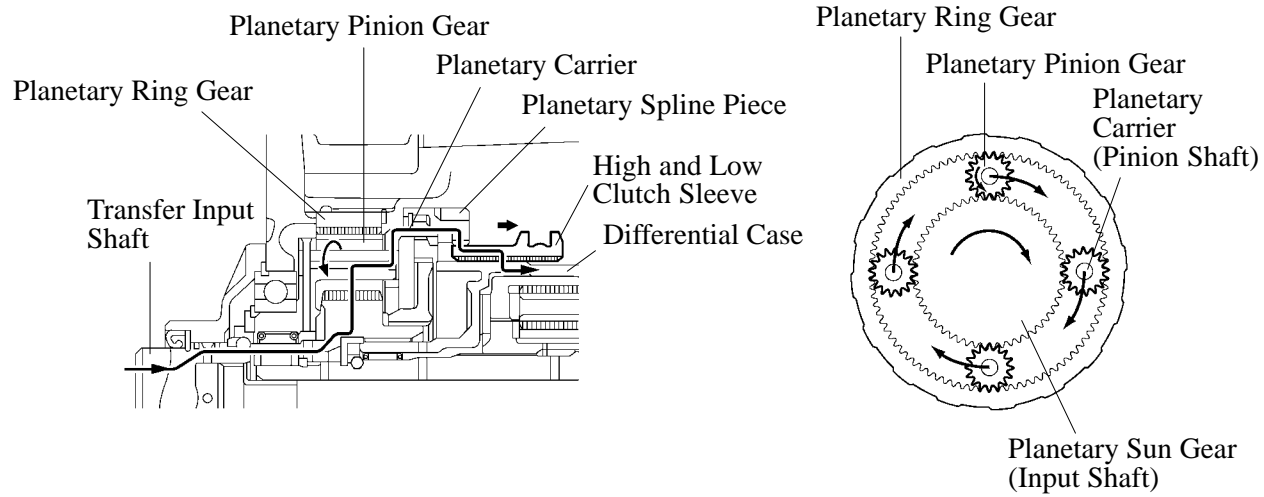


232CH54

L Position

In the L position, the external teeth of the high and low clutch sleeve are meshed with the planetary spline piece.

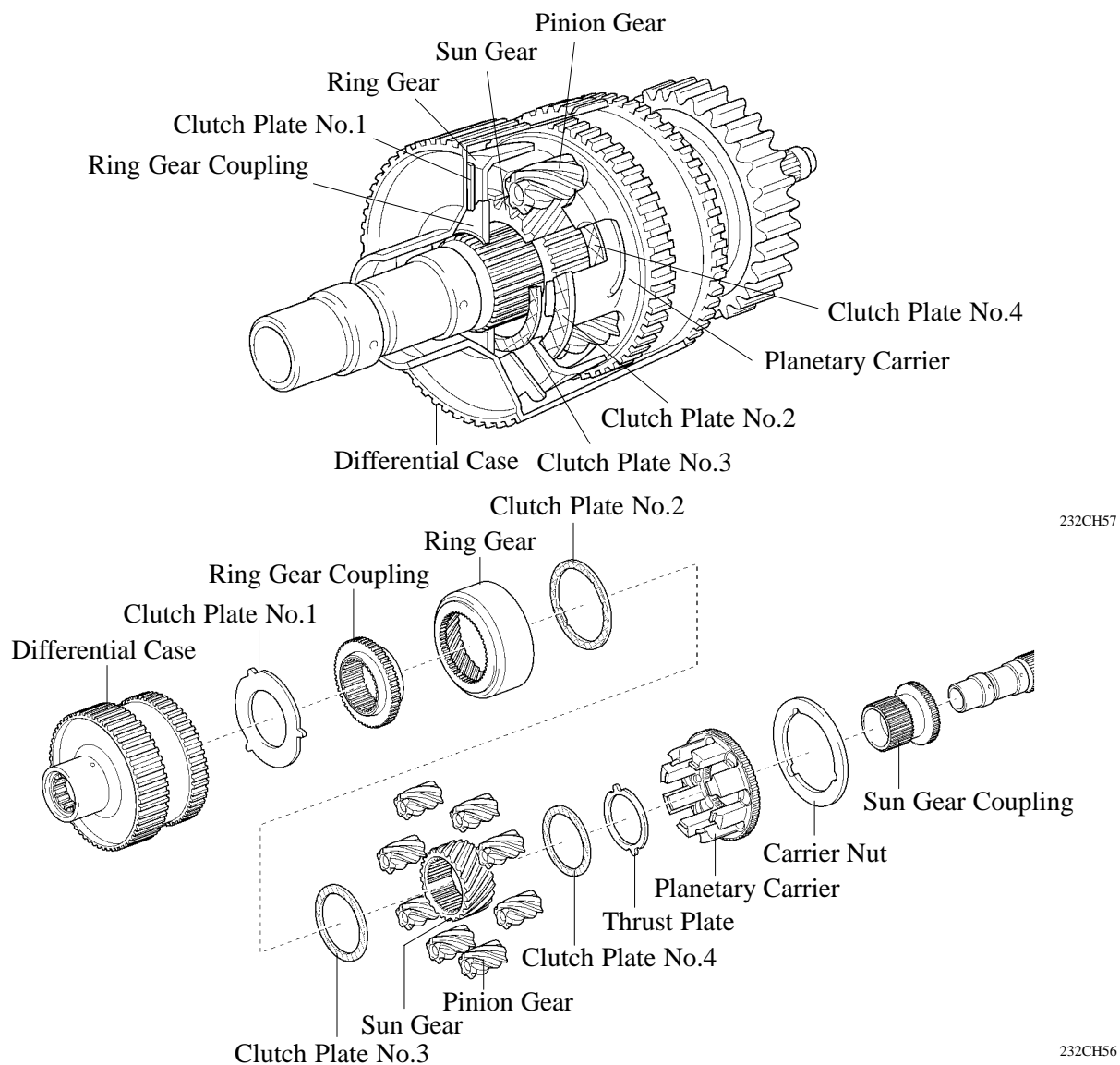
Thus, the rotation of the input shaft is transmitted in a reduced form to the planetary sun gear, planetary pinion gear, planetary pinion gear shaft, planetary carrier, planetary spline piece, high and low clutch sleeve, high and low clutch hub, and differential case of TORSEN LSD.



3. Center Differential (TORSEN LSD)

General

- The center differential uses a TORSEN LSD (Limited Slip Differential).
- The TORSEN LSD is a torque-sensing LSD. It generates a limited-differential torque in proportion to the drive torque, and instantly changes the front and rear torque distribution.
- The torque distribution during straightline driving is 40/60 (front/rear), which is helpful for an appropriate steering response during the initial stage of a turn. During the acceleration stage of a turn, the torque distribution increases the rear wheels.
- This center differential consists of a differential case, coupling, ring gear, 8 pinion gears, sun gear, and carrier.

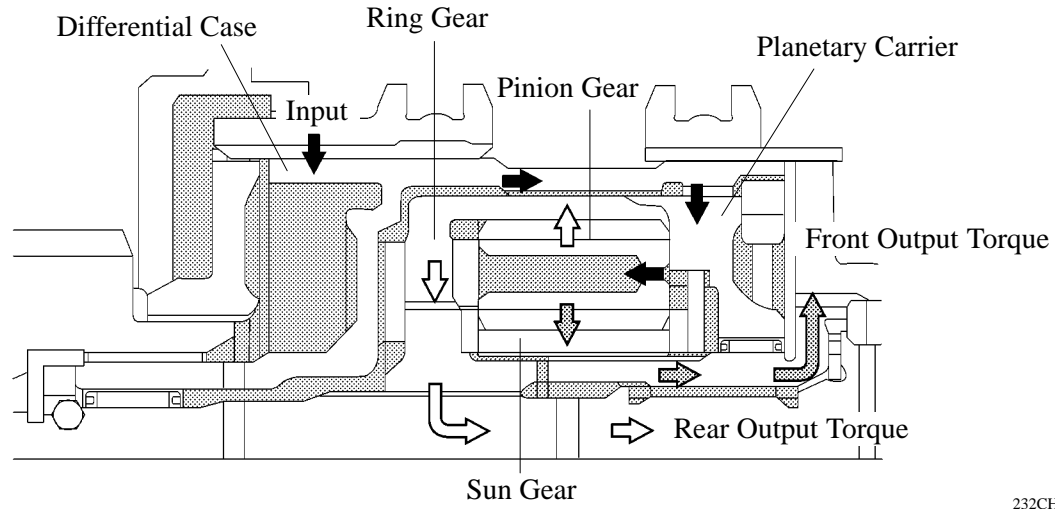


Service Tip

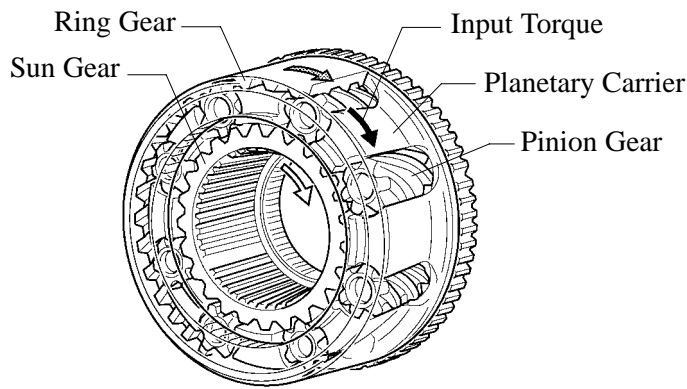
The TORSEN LSD cannot be disassembled, so it must be replaced as an assembly. For details, see the 2003 4Runner Repair Manual (Pub. No. RM1001U).

Normal Driving Operation

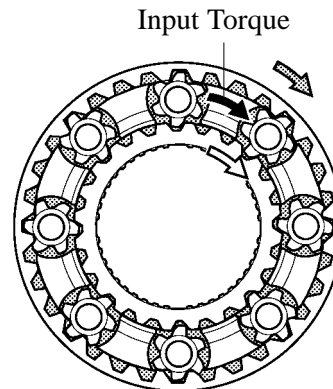
During normal driving (front wheel speed = rear wheel speed), the driving force that is input by the differential case is transmitted (Front: 40/ Rear: 60) as shown below, without involving the LSD function.



232CH58

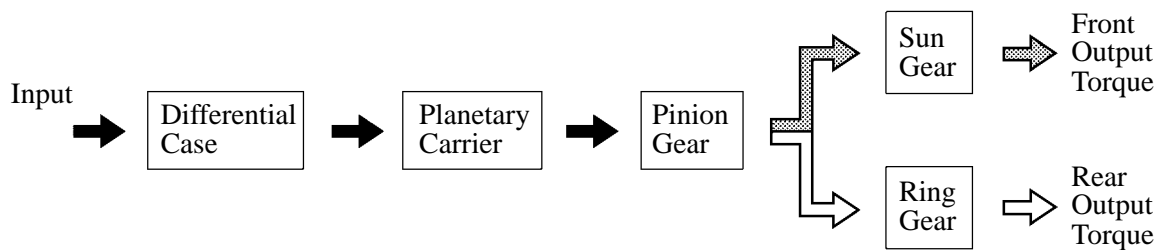


232CH126



232CH59

► **Torque Transmission Path** ◀



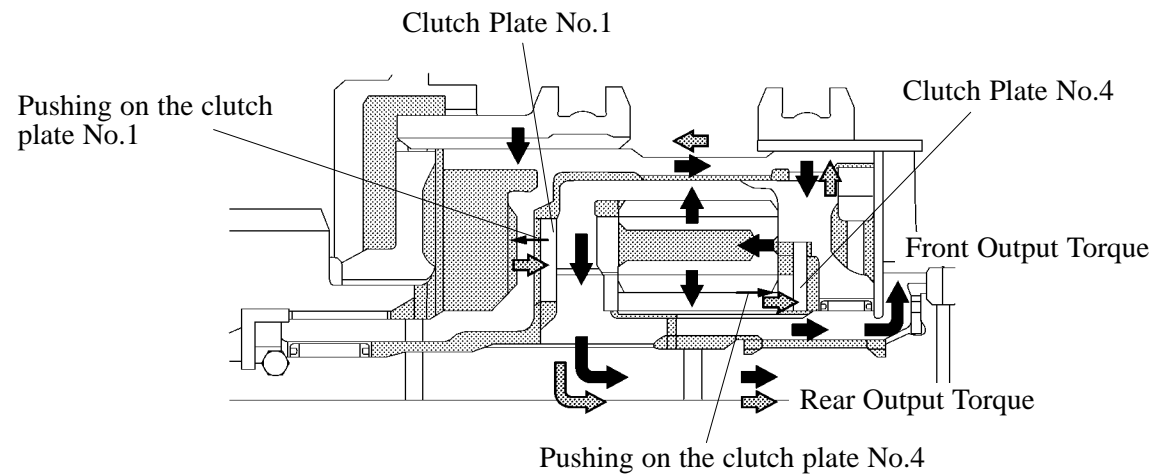
232CH60

Front Wheel Skid Driving Operation

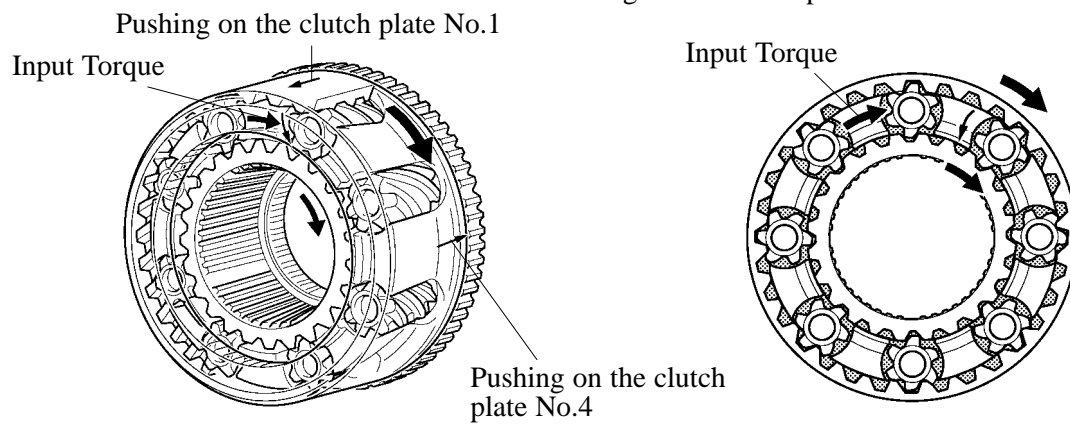
During front wheel skid driving (front wheel speed > rear wheel speed) when a rotational difference exists between the sun gear and the ring gear, the torque distribution of the driving force (torque) that is input by the differential case changes instantly before the torque is transmitted, as follows:

- The sun gear transmits torque to the planetary carrier while pushing on the clutch plate No.4. The planetary carrier transmits this torque to the ring gear from the differential case via the clutch plate No.1.
- The ring gear outputs torque while pushing on the clutch plate No.1.

These LSD functions change the torque distribution.



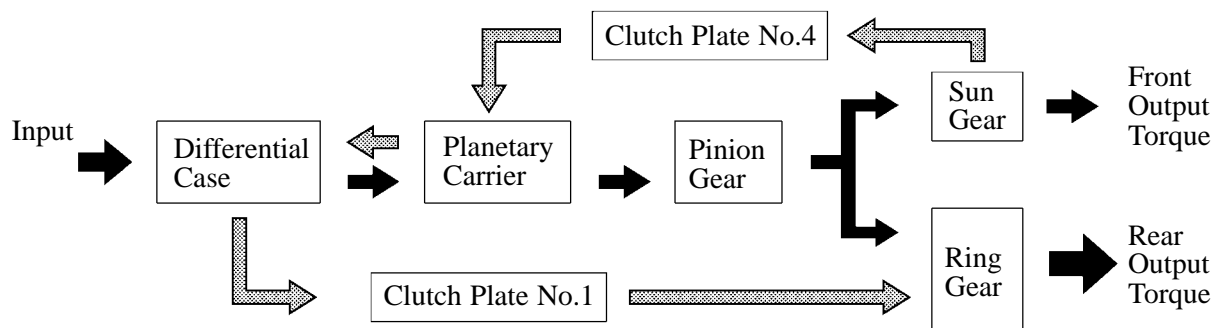
232CH62



232CH63

232CH66

► Torque Transmission Path ◀



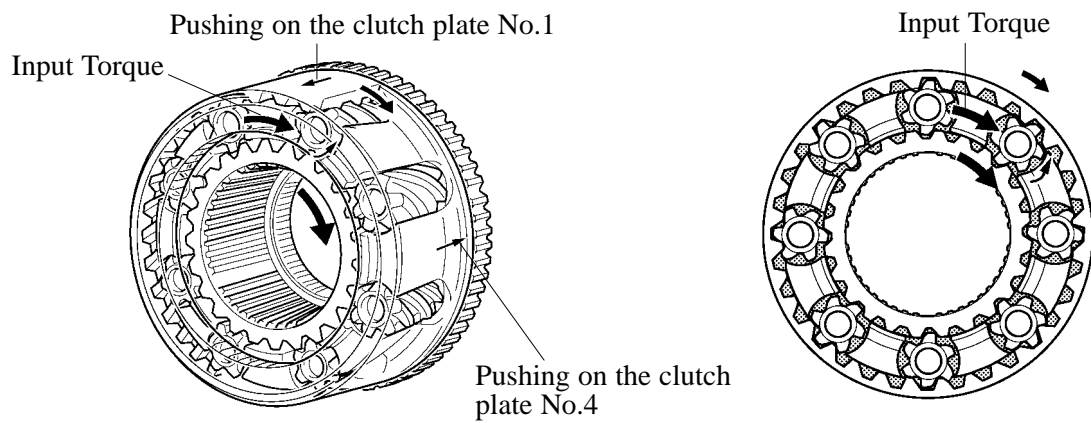
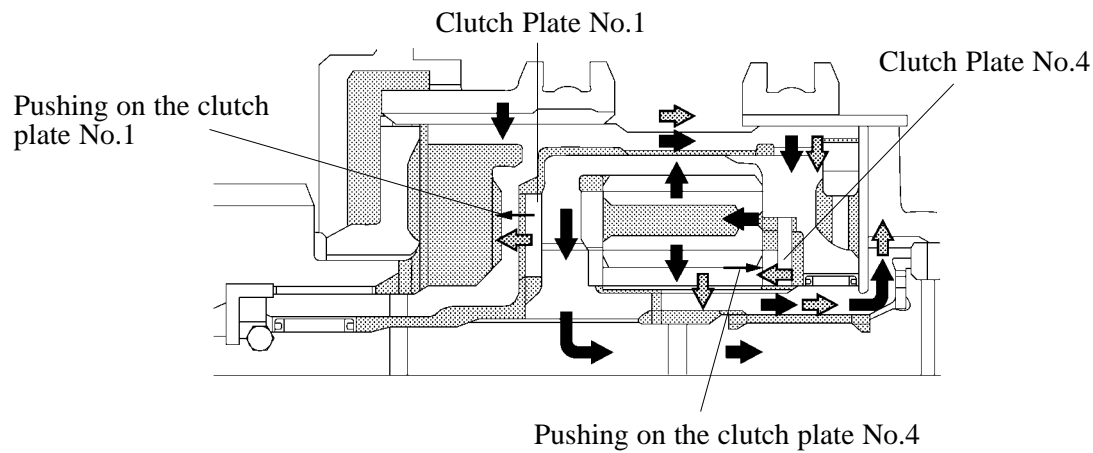
232CH61

Rear Wheel Skid Driving Operation

During rear wheel skid driving (front wheel speed < rear wheel speed), when a rotational difference exists between the sun gear and the ring gear, the torque distribution of the driving force (torque) that is input by the differential case changes instantly before the torque is transmitted, as follows:

- The ring gear transmits torque to the differential case while pushing the clutch plate No.1. The differential case transmits this torque from the planetary carrier to the sun gear via the clutch plate No.4.
- The sun gear outputs torque while pushing on the clutch plate No.4.

These LSD functions change the torque distribution.

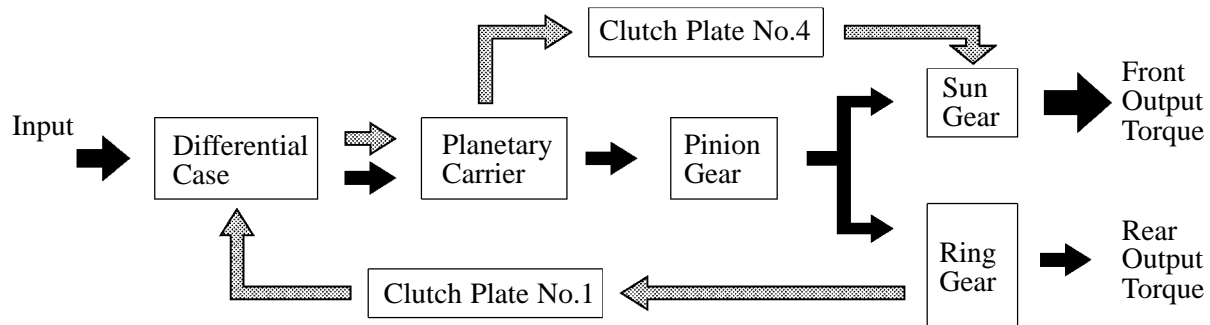


232CH65

232CH67

232CH68

► **Torque Transmission Path** ◀



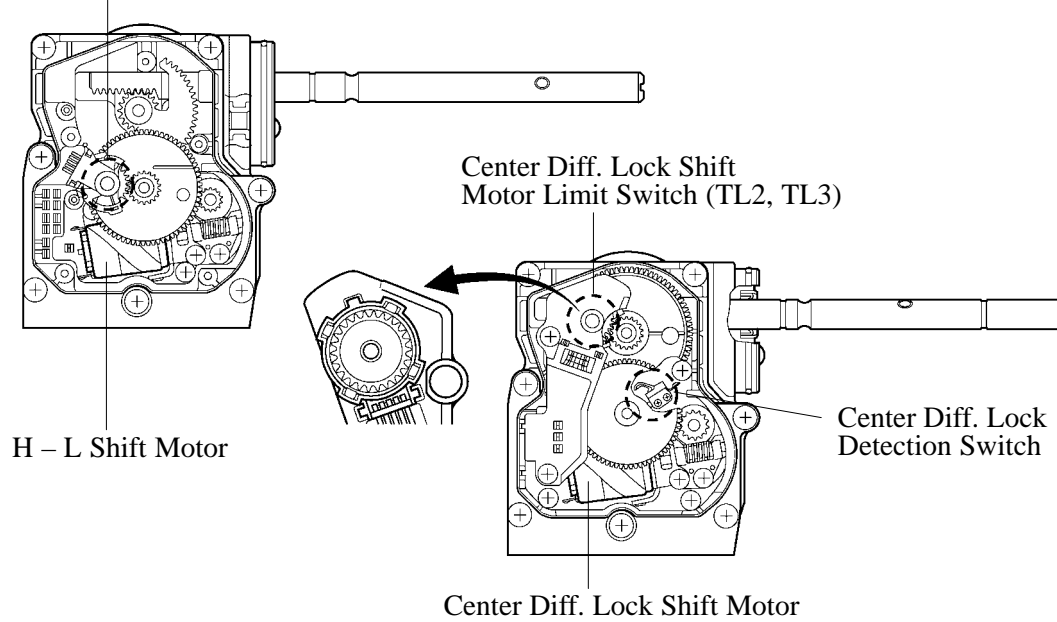
232CH64

4. Transfer Shift Actuator

- The transfer shift actuator, which contains H – L shift motor, center diff. lock shift motor, H – L shift motor limit switch, center differential lock shift motor limit switch, and center diff. lock detection switch, cannot be disassembled.
- The constructions of H – L and center diff. lock shift motor limit switches are the same. The limit switch has 2 contact point switches. 2 contact point switches contacted by protuberance and the combinations of 2 contact point switches have detected shift motor position (4WD mode).

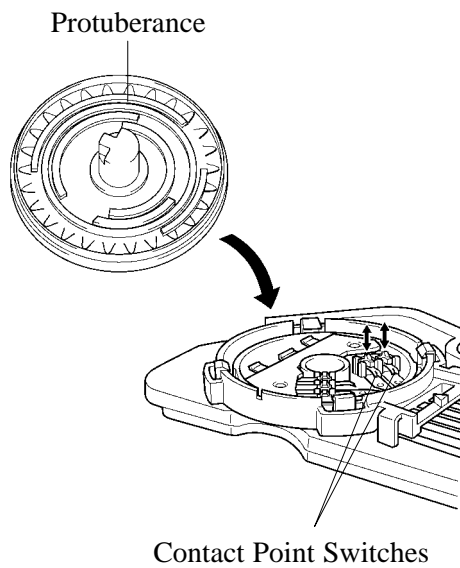
► Cross Section of Transfer Shift Actuator ◀

H – L Shift Motor Limit Switch (HL1, HL2)

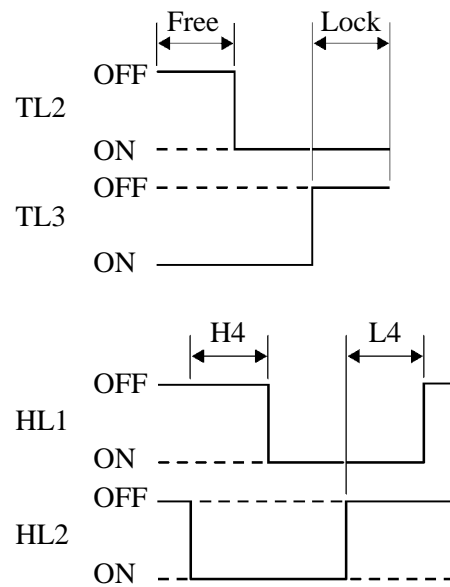


232CH125

► Limit Switch ◀



232CH152



232CH153

232CH154

Combinations of 2 Contact Point Switches