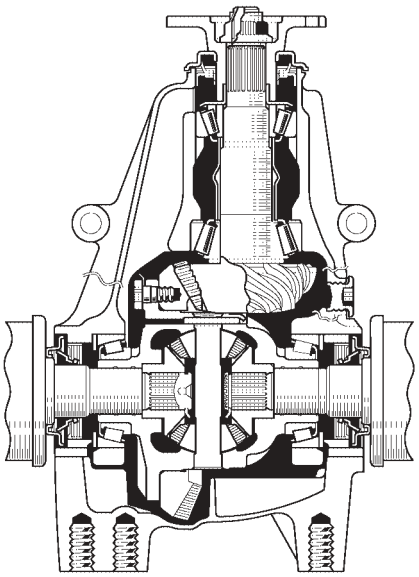
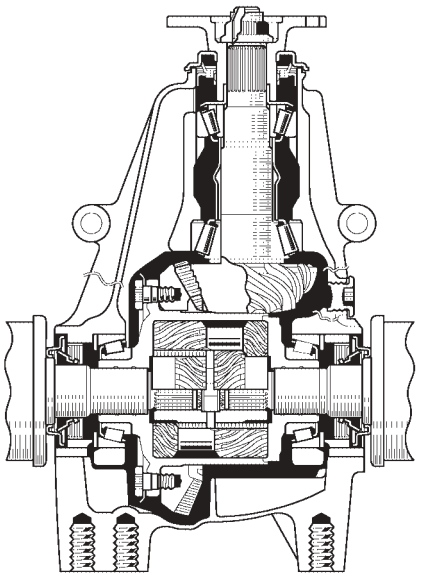
■REAR DIFFERENTIAL

1. General

In the new Kluger, a 2-pinion type differential is standard equipment.
In the model without VSC, a helical gear type Torsen LSD (torque-sensing Limited Slip Differential) is adopted to provide superior driving performance as optional equipment.



Normal Differential



Torsen LSD

D012CH09

▶ Specifications ◀

Differential Type		F17SU (Standard)	F17TU (Option)
Differential Gear Ratio		2.928	←
Drive Pinion	No. of Teeth	14	←
Ring Gear	Size mm (in.)	170 (6.7)	←
	No. of Teeth	41	←
No. of Differential Pinion		2	8

2. Helical Gear Type Torsen LSD

Characteristics

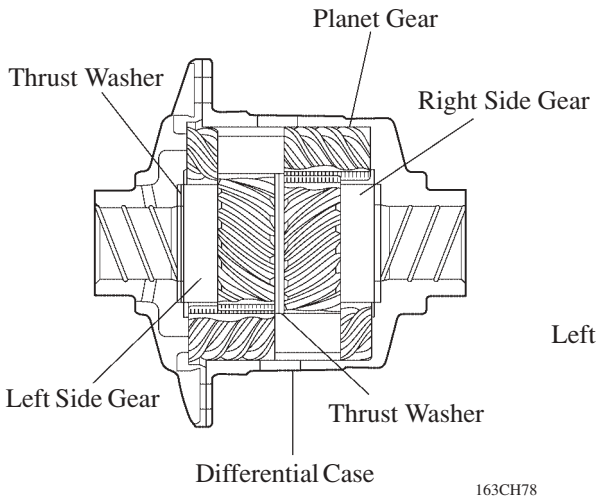
- The helical gear type Torsen LSD is a torque-sensing LSD that delivers strong traction, so it provides superior responsiveness to accelerator operation and makes sporty driving possible.
- The change in the bias ratio over time is low, so stable performance can be maintained.
- Oil exclusively for the LSD is not required and normal oil is used, so the maintenance cost is low.

Construction

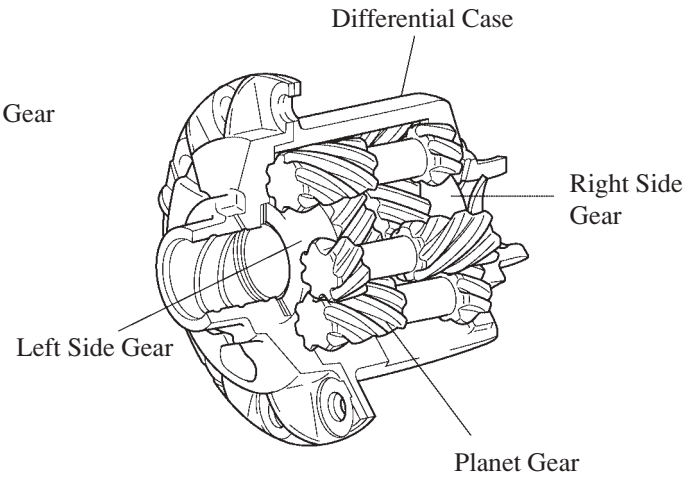
The helical gear type TORSEN LSD consists of a differential case, 8 planet gears, 2 side gears and 4 thrust washers.

Planet gears mesh with one another as a pair, and each gear of the pair meshes with the side gear on its right or left side.

The planet gears are supported by the hole that is provided in the differential case. They are constructed so that they revolve while rotating over the side gear.



163CH78

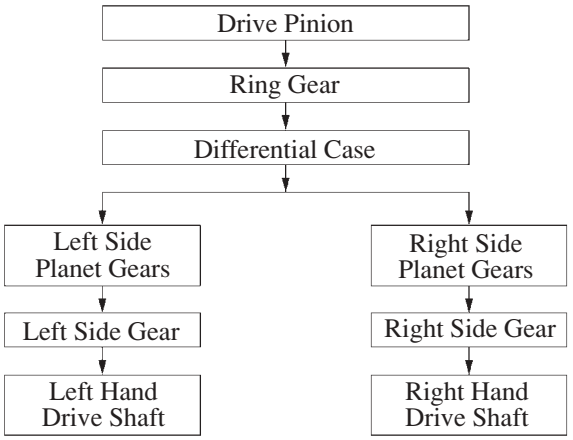


163CH79

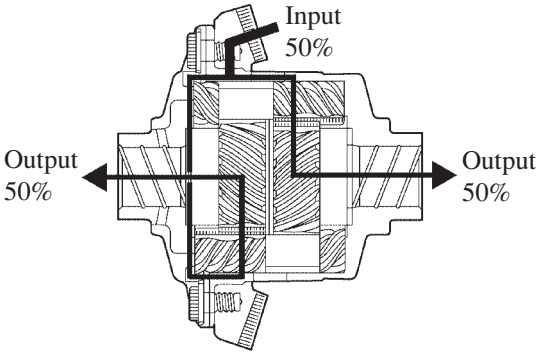
Operation

1) Straight-Ahead Operation

Since side gears (left and right) and planet gears are rotating together with the differential case as a unit when the vehicle is running straight-forward, the driving force is transmitted from the ring gear to the differential case, planet gears and side gears.



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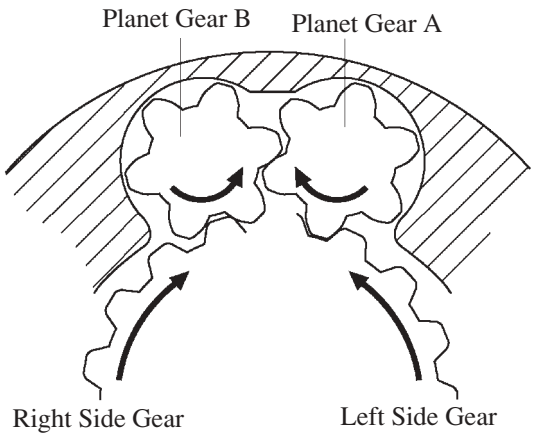


163CH80

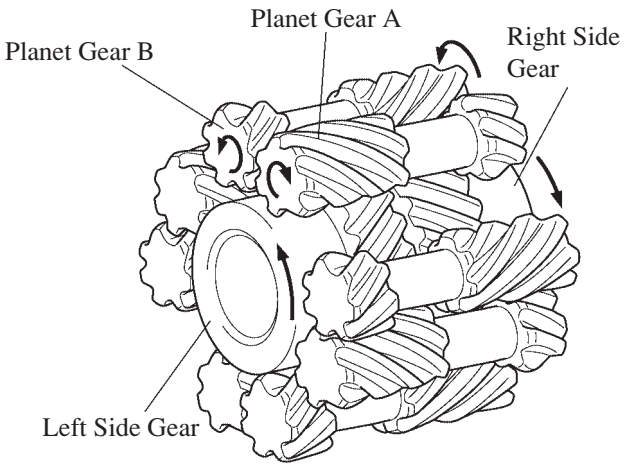
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2) Cornering

Supposing that the differential case is not moving, rotating the left side gear counterclockwise causes planet gear A (which meshes with the left side gear) to rotate clockwise.
Furthermore, planet gear B, which is paired with planet gear A, rotates counterclockwise, causing the right side gear (which meshes with planet gear B) to rotate clockwise.
Therefore the left and right side gears rotate in the opposite direction each other, thus accomplishing a motion differential.



163CH81



163CH82

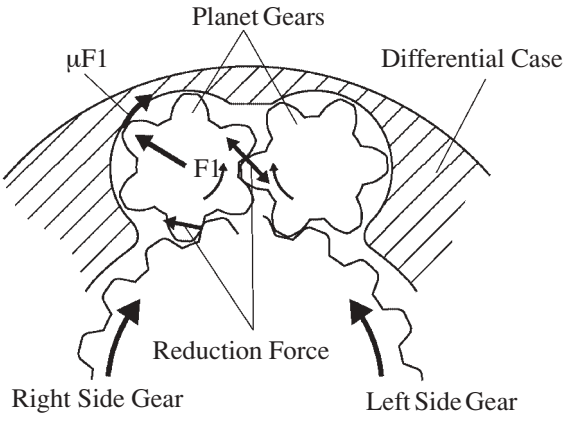
3) Straight-Ahead Operation

Limited slip is accomplished primarily by the friction that is generated between the planet gear's tooth tips and the differential case's inner wall, and the friction that is generated between the side gear end face and the thrust washer.

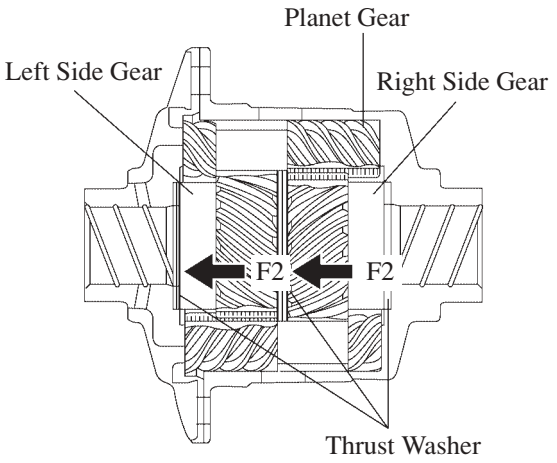
The principle of limited slip enables the resultant reaction force F1 (which is created by the meshing reaction of the planet gear and the side gear and the meshing reaction of the planet gears themselves) to push the planet gear in the direction of the differential case in proportion to the input torque.

Due to the reaction force F1, the friction force μF1 (which is generated between the tooth tip of the planet gear and the inner wall of the differential case) acts in the direction to stop the planet gear's rotation.

At the same time, because of the helical angle that is provided in the differential gear, thrust force F2 is generated towards the axle shaft. Accordingly, friction force μF2 (which is generated between the side gear end face and the thrust washer) applies a force to cancel out the rotational difference between the side gears themselves as well as between the side gear and the differential case.



163CH83



163CH84