

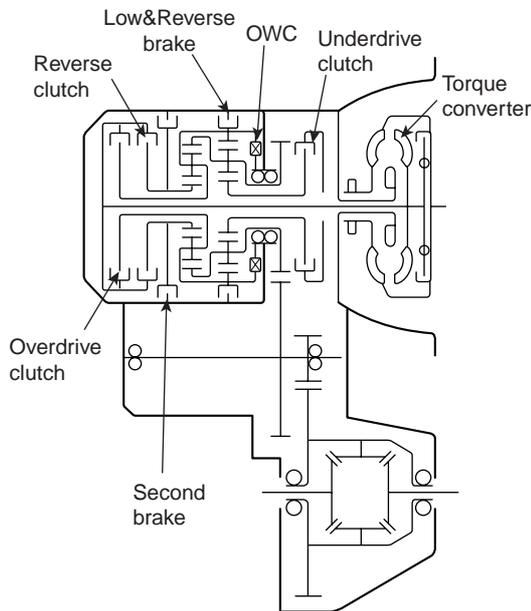
- 1. Reverse clutch
- 2. Overdrive planetary gear set
- 3. Second brake
- 4. Low-reverse brake
- 5. Output planetary gear set
- 6. Oneway clutch
- 7. Oneway clutch inner race
- 8. Transfer drive gear
- 9. Underdrive clutch

- 10. Torque converter
- 11. Input shaft
- 12. Oil pump
- 13. Converter housing
- 14. Differential
- 15. Transfer driven gear
- 16. Output shaft
- 17. Rear cover
- 18. Overdrive clutch

MECHANICAL SYSTEM

OPERATION COMPONENTS AND FUNCTION

| Operating Element | Symbol | Function |
|---------------------|--------|---|
| Under drive clutch | UD | Connect input shaft and under drive sun gear |
| Reverse clutch | REV | Connect input shaft and reverse sun gear |
| Overdrive clutch | OD | Connect input shaft and over drive carrier |
| Low & Reverse brake | LR | Hold LR annulus gear and OD carrier |
| Second brake | 2ND | Hold reverse sun gear |
| One way clutch | OWC | Restrict the rotating direction of low & reverse annulus gear |



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OPERATING ELEMENTS

| | UD/C | OD/C | REV/C | 2ND/B | LR/B | OWC |
|----|------|------|-------|-------|------|-----|
| P | | | | | | |
| R | | | | | | |
| N | | | | | | |
| D1 | | | | | | |
| D2 | | | | | | |
| D3 | | | | | | |
| D4 | | | | | | |

- 1) : OWC is operated when shifts from 1st gear to 2nd gear.
- 2) L & R brake is released in 1st gear when the vehicle speed is more than 5KPH approximately.

TORQUE CONVERTER AND SHAFT

The torque converter consists of an impeller(pump), turbine and stator assembly in a single unit. The pump is connected to the engine crankshaft and turns as the engine turns. This drawing force is transmitted to the turbine through the oil which is recycled by the stator.

The transmission has two parallel shafts ; the input shaft and the output shaft. Both shafts are in line with the engine crankshaft. The input shaft includes the overdrive clutch, reverse clutch, underdrive clutch, one way clutch, 2ND brake, low & reverse brake, overdrive planetary carrier, output planetary carrier and transfer drive gear. The output shaft includes the transfer driven gear.

CLUTCHES

The gear changing mechanism utilizes three multi-disc clutches. The retainers of these clutches are fabricated from high-precision sheet metal for lightness and ease of production. Also, more responsive gearshifts at high engine speeds are achieved by a pressure-balanced piston mechanism that cancels out centrifugal hydraulic pressure. This mechanism replaces the conventional ball check valve.

UNDERDRIVE CLUTCH

The underdrive clutch operates in 1st, 2nd, and 3rd gears and transmits driving force from the input shaft to the underdrive sun gear(A).

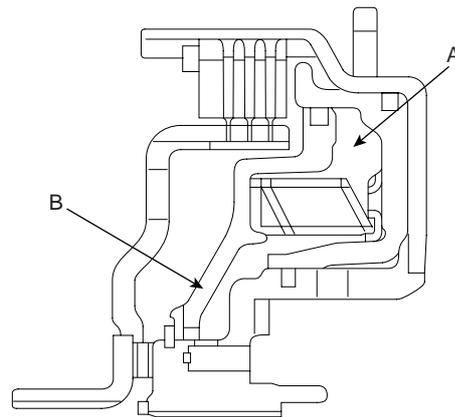
The components comprising the under clutch are as illustrated below.

Hydraulic pressure acts in the piston pressure chamber(B) (between the piston(c) and retainer) and thus pushes the piston(C). In turn, the piston depresses the clutch discs and thereby transmits driving force from the retainer(D) to the hub(E) side.

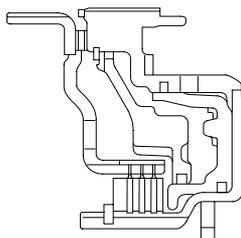
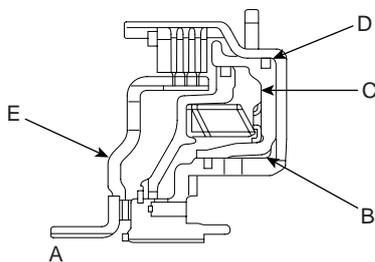
At high speed, fluid remaining in the piston pressure chamber is subjected to centrifugal force and attempts to push the piston.

However, fluid in the balance fluid chamber(A) (the space between the piston and return spring retainer(B)) is also subjected to centrifugal force.

Thus, the hydraulic pressure on one side of the piston cancels out the hydraulic pressure on the other side, and the piston does not move.



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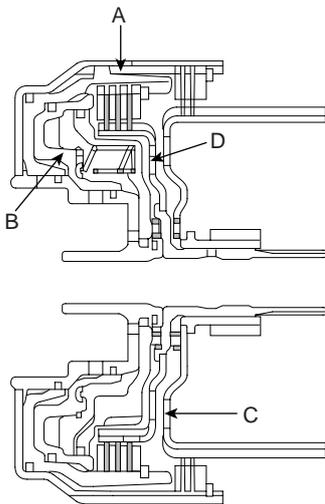


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REVERSE CLUTCH AND OVERDRIVE CLUTCH

The reverse clutch(C) operates when the reverse gear is selected and transmits driving force from the input shaft to the reverse sun gear.

The overdrive clutch(D) operates in 3rd and 4th gears and transmits driving force from the input shaft to the overdrive planetary carrier and low-reverse annulus gear.



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BRAKES

The gear changing mechanism utilizes two multi-disc brakes.

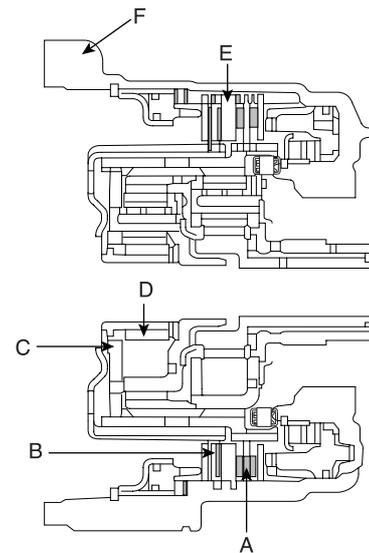
LOW & REVERSE BRAKE AND SECOND BRAKE

The low & reverse brake(A) operates in 1st and reverse gears, when the vehicle is parked, and during manual operation. It locks the low & reverse annulus gear and overdrive planetary carrier to the case.

The second(C) brake(B) operates in 2nd and 4th gears and locks the reverse sun gear(D) to the case.

The components comprising the low & reverse brake and second brake are as illustrated below.

As shown, the discs and plates of the two brakes are arranged on either side of the rear cushion plate(E), which is itself secured to the case(F) by a snap ring.



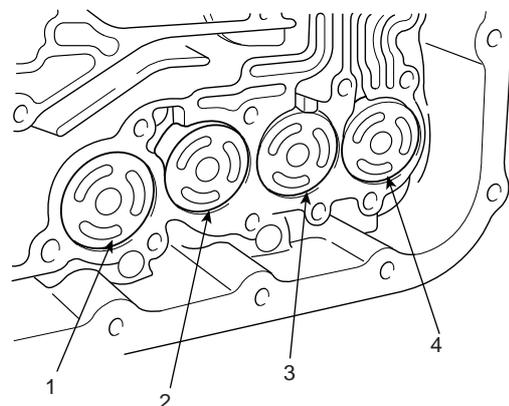
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OWC

To improve the shift feeling from 1st to 2nd gear, OWC was adopted on the low & reverse brake annulus gear. Instead of hydraulic fixing by Low & reverse brake at the 1st gear, this mechanical fixing device was used. This structure is not a new concept, because this OWC already has been installed on the previous models.

ACCUMULATORS

| Number | Function Name | Color |
|--------|---------------------|--------|
| 1 | Low & Reverse Brake | None |
| 2 | Underdrive Clutch | Yellow |
| 3 | Second Brake | Blue |
| 4 | Overdrive Clutch | None |



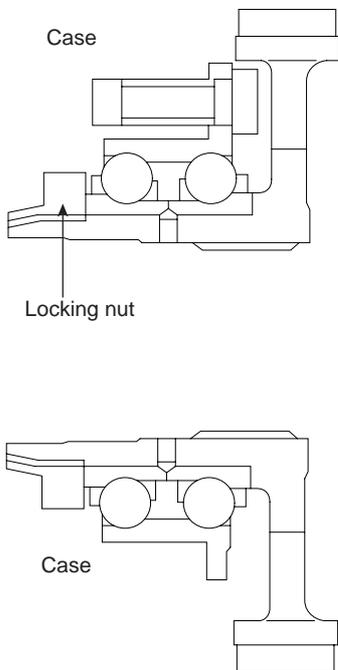
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OBJECTIVE

- * Energy (hydraulic pressure) storage
- * Impact and pulsation damping when solenoid valves operating
- * Operation as spring element
- * Smooth shifting by preventing sudden operation of clutches and brakes

TRANSFER DRIVE GEAR

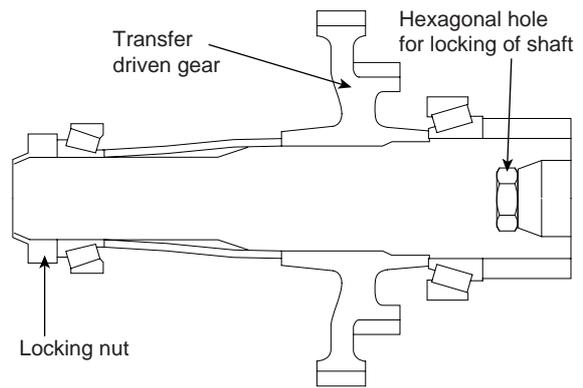
With the transfer drive gear, increased tooth height and a higher contact ratio have reduced gear noise. Also, the bearing that supports the drive gear is a pre-loaded type that eliminates rattle, and the rigidity of the gear mounting has been increased by bolting the bearing directly onto the case.



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OUTPUT SHAFT/TRANSFER DRIVEN GEAR

As shown in the illustration below, the transfer driven gear is press-fitted onto the output shaft, and the output shaft is secured by a locking nut and supported by bearings. The locking nut has a left-handed thread, and a hexagonal hole in the other end of the shaft enables the shaft to be held in position for locking nut removal.



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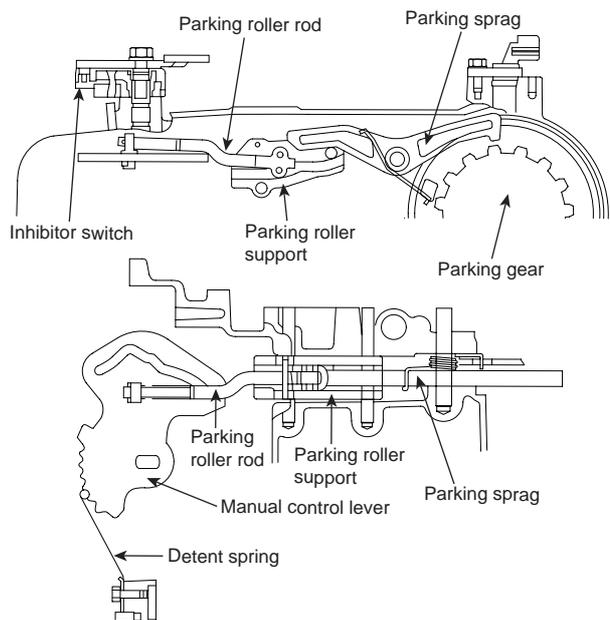
MANUAL CONTROL SYSTEM

MANUAL CONTROL LEVER

The manual control lever is fitted to the top of the valve body and is linked to the parking roller rod and manual control valve pin. A detent mechanism is provided to improve the gear shift feeling during manual selection.

PARKING MECHANISM

When the manual control lever is moved to the parking position, the parking roller rod moves along the parking roller support and pushes up the parking sprag. As a result, the parking sprag meshes with the transfer driven gear (parking gear), thereby locking the output shaft. To minimize the operating force required, a roller is fitted to the end of the rod.



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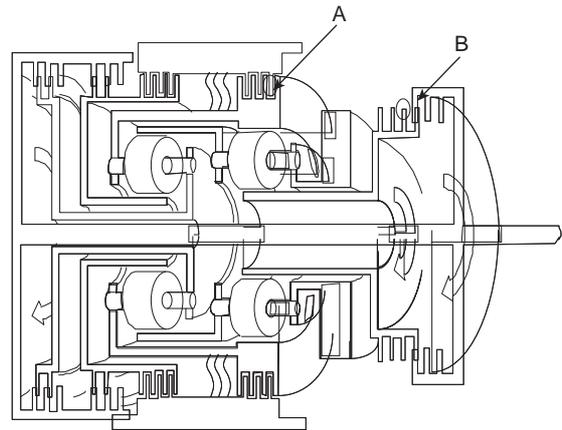
POWER TRAIN E5E54FA9

P POSITION

Hydraulic pressure is applied to the LR brake and the RED brake, so power is not transmitted from the input shaft to the UD clutch or OD clutch, and the output shaft is locked by the park brake pawl interlocking the park gear.

N POSITION

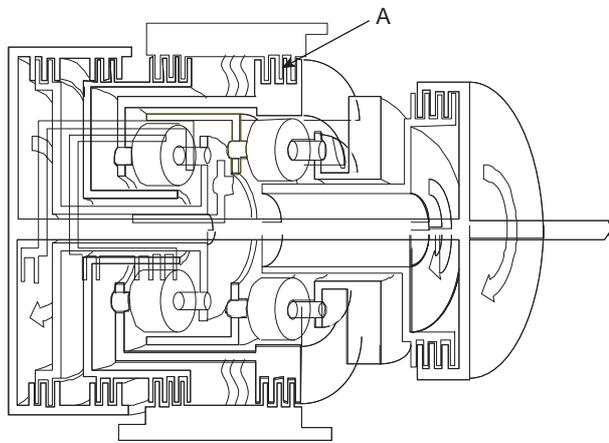
Hydraulic pressure is applied to the LR brake(A) and the RED brake, so power is not transmitted from the input shaft to the UD clutch or OD clutch.



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2ND GEAR POWER FLOW

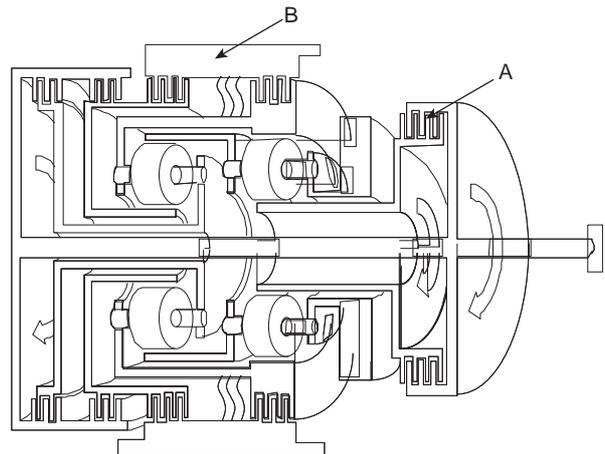
Hydraulic pressure is applied to the UD clutch(A) the 2nd brake(B) and the one way clutch(OWC), then the UD clutch transmits driving force from the input shaft to the UD sun gear, and the 2nd brake locks the reverse sun gear to the case. The UD sun gear of the planetary gear drives the output pinion gear and the LR annulus gear, and the LR annulus gear drives the OD planetary carriers, and OD planetary carriers drives OD pinion gear, and the OD pinion gear drives the output carriers, and the output carrier drives the transfer drive gear, and the transfer drive gear drives the transfer driven gear of the output shaft, and power is transmitted to the differential gear through the differential drive gear.



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1ST GEAR POWER FLOW

Hydraulic pressure is applied to the UD clutch(B) the LR brake(A) and the one way clutch(OWC), then the UD clutch transmits driving force from the input shaft to the UD sun gear, and the LR brake locks the LR annulus gear to the case. The UD sun gear of the planetary gear drives the output pinion gear, and the LR brake locks the annulus gear, and the output pinion drives the output carriers, and the output carrier drives the transfer drive gear, and the transfer drive gear drives the transfer driven gear of the output shaft, and power is transmitted to the differential gear through the differential drive gear.



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