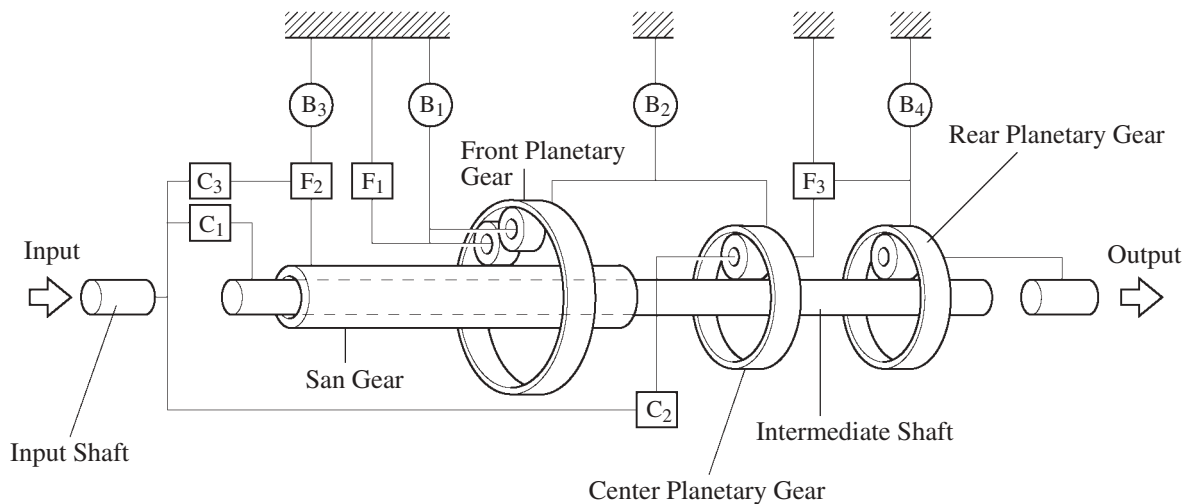


4. Planetary Gear Unit

Construction

- The 5-speed configuration has been achieved without increasing the number of planetary gears, thus creating a 5-speed automatic transmission, practically the same as the previous 4-speed automatic transmission.
- The front planetary carrier is made of aluminum to reduce the weight.
- A centrifugal fluid pressure canceling mechanism has been adopted in the C₁, C₂, and C₃ clutches that are applied when shifting from 2nd to 3rd, from 3rd to 4th and from 4th to 5th. For details, refer to [page 64](#).



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Function of Component

Component		Function
C ₁	No.1 Clutch	Connects input shaft and intermediate shaft.
C ₂	No.2 Clutch	Connects input shaft and center planetary carrier.
C ₃	No.3 Clutch	Connects input shaft and front sun gear.
B ₁	No.1 Brake	Prevents front planetary carrier from turning either clockwise or counterclockwise.
B ₂	No.2 Brake	Prevents front and center ring gear from turning either clockwise or counterclockwise.
B ₃	No.3 Brake	Prevents outer race of F ₂ from turning either clockwise or counterclockwise.
B ₄	No.4 Brake	Prevents rear ring gear from turning either clockwise or counterclockwise.
F ₁	No.1 One-Way Clutch	Prevents front planetary carrier from turning counterclockwise.
F ₂	No.2 One-Way Clutch	When B ₃ is operating, prevents planetary sun gear from turning counterclockwise.
F ₃	No.3 One-Way Clutch	Prevents center planetary carrier and rear ring gear from turning counterclockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

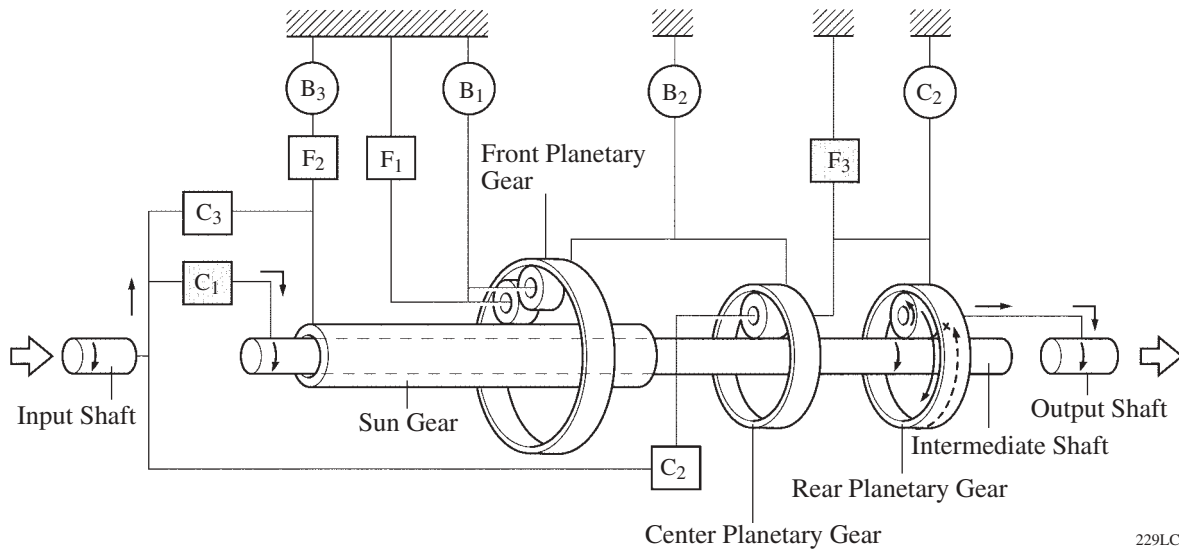
Transmission Power Flow

Shift Lever Position	Gear	Solenoid Valve						Clutch			Brake				One-way Clutch		
		S1	S2	SR	SL1	SL2	SLU	C ₁	C ₂	C ₃	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃
P	Park	ON				ON											
R	Reverse*	ON				ON				○	○			○	○		
N	Neutral	ON				ON											
D	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○			●		○		
	4th					ON	ON	○	○	●			●				
	5th			ON	ON		ON		○	○	○		●				
4	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○			●		○		
	4th					ON	ON	○	○	●			●				
3	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd*		ON					○		○	○		●				
2	1st	ON				ON		○									○
	2nd*	ON	ON	ON				○				○	○				
L	1st*	ON						○						○			

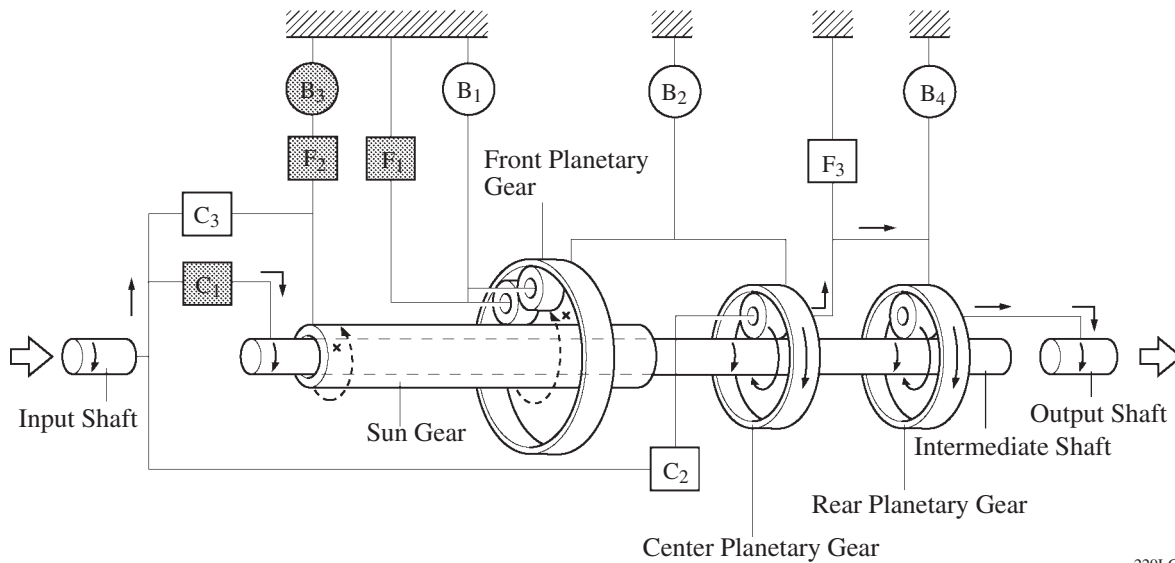
○ : Operation

● : Operate but is not related to power transmission

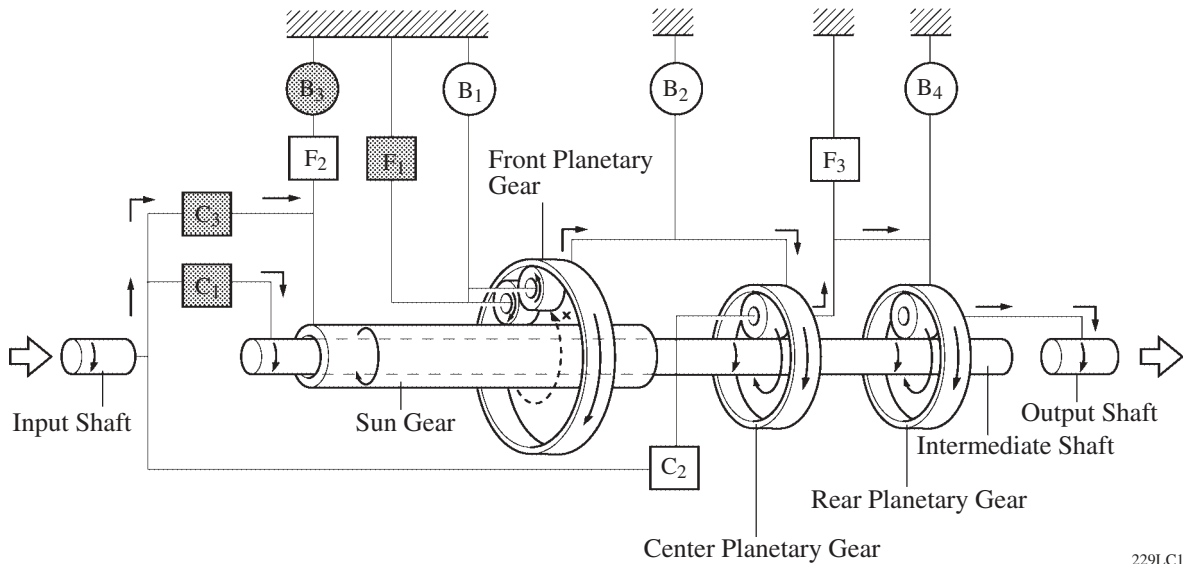
* : with Engine Brake

1st Gear (D, 4, 3 or 2 Position)

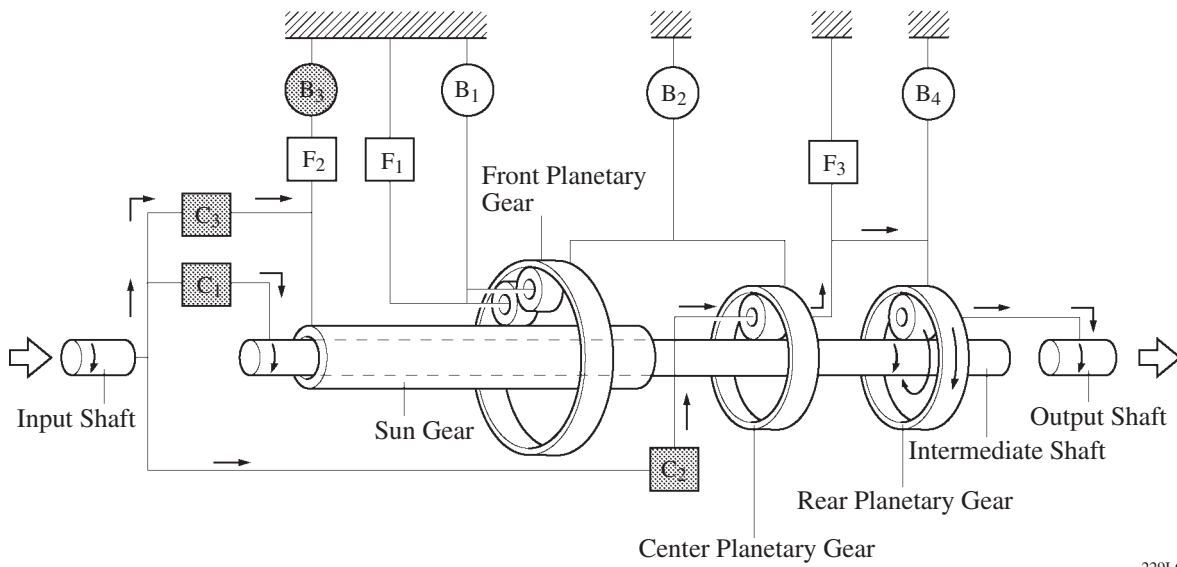
229LC174

2nd Gear (D, 4 or 3 Position)

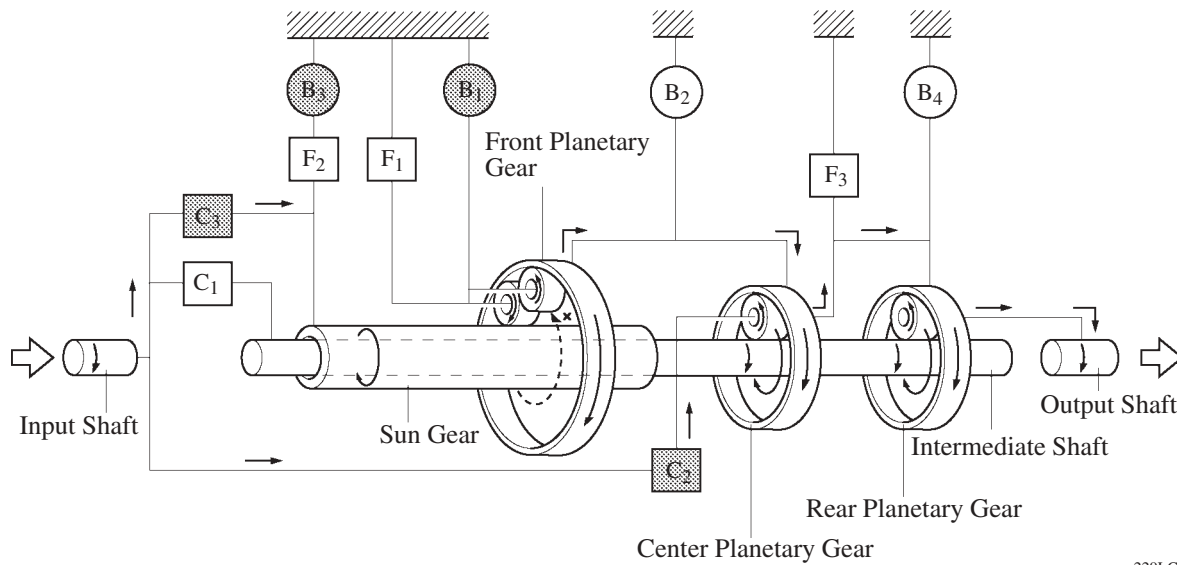
229LC175

3rd Gear (D or 4 Position)

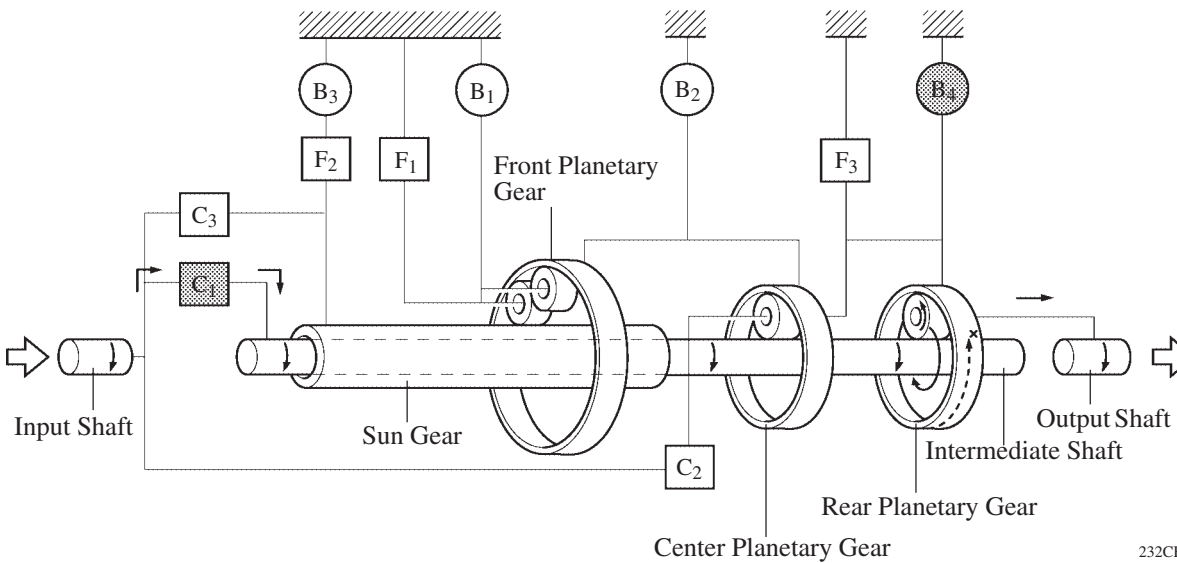
229LC176

4th Gear (D or 4 Position)

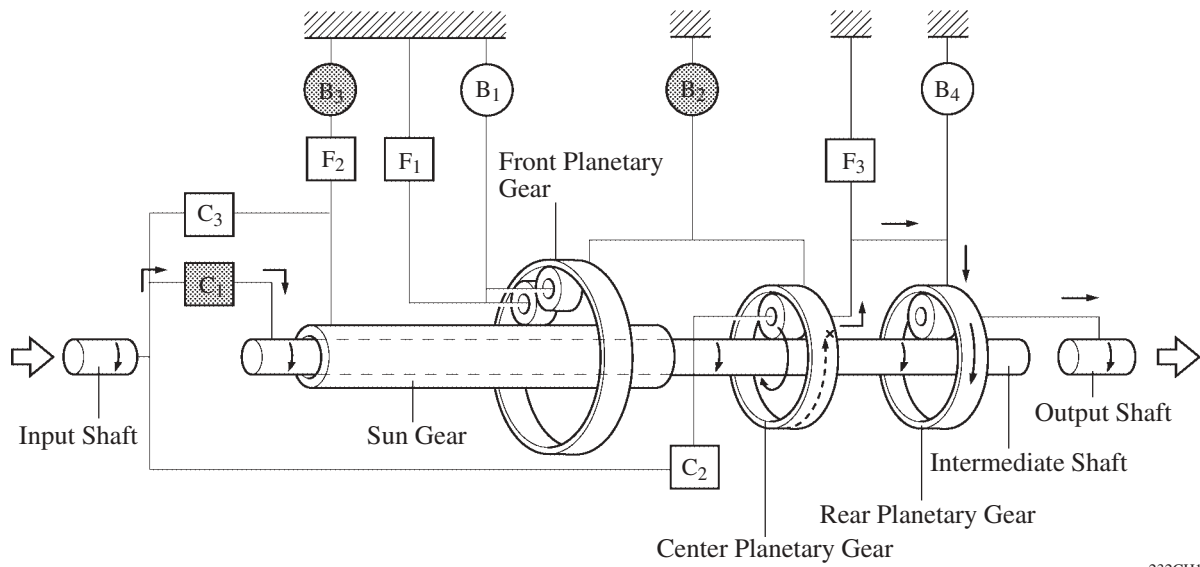
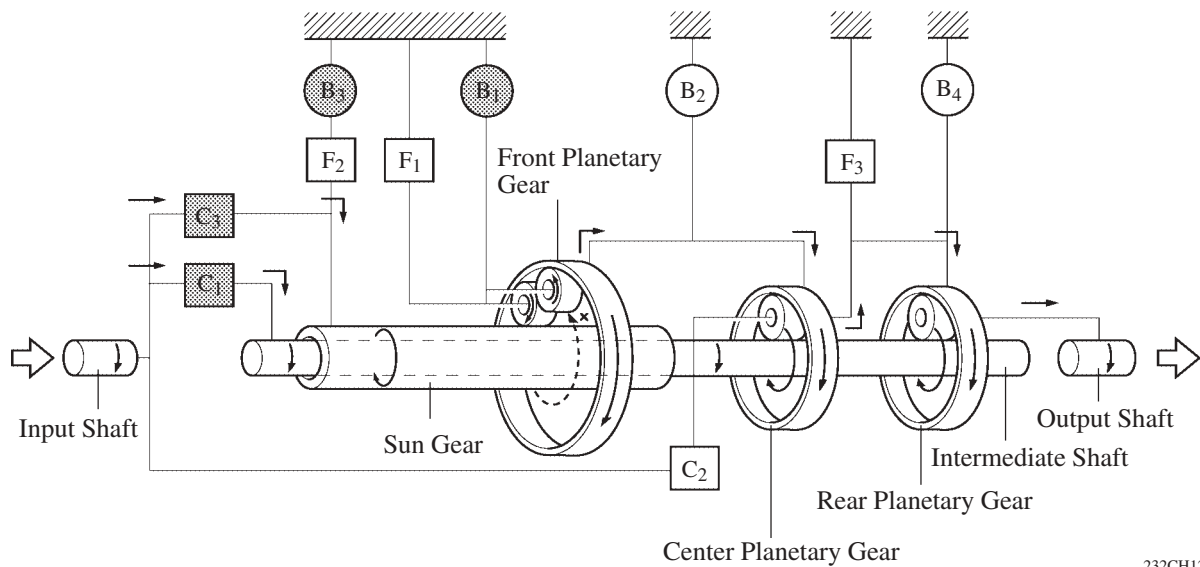
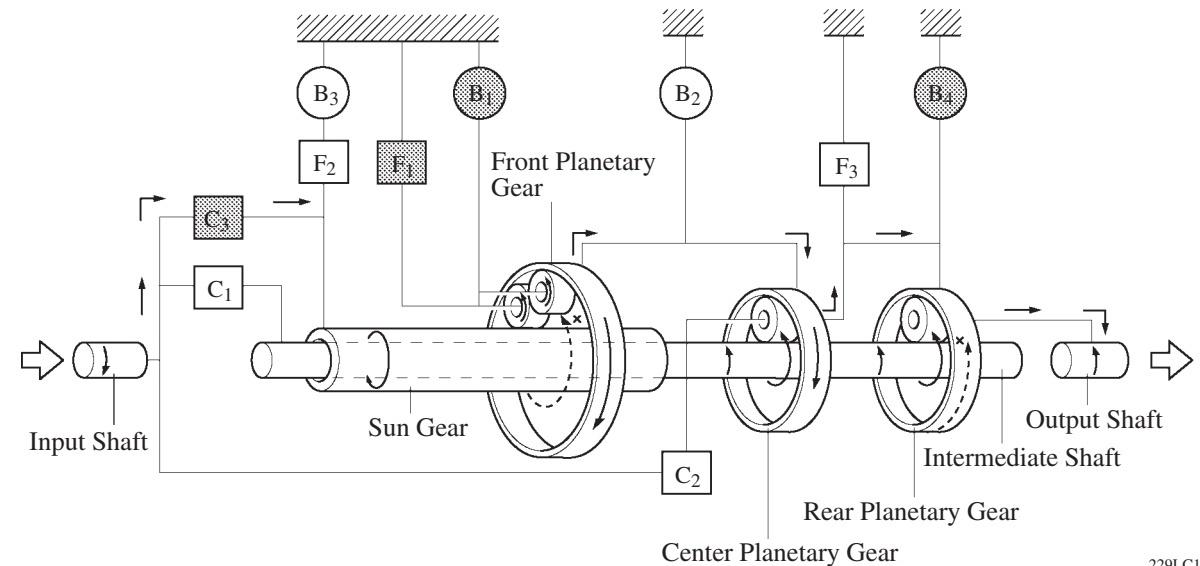
229LC177

5th Gear (D Position)

229LC178

1st Gear (L Position)

232CH118

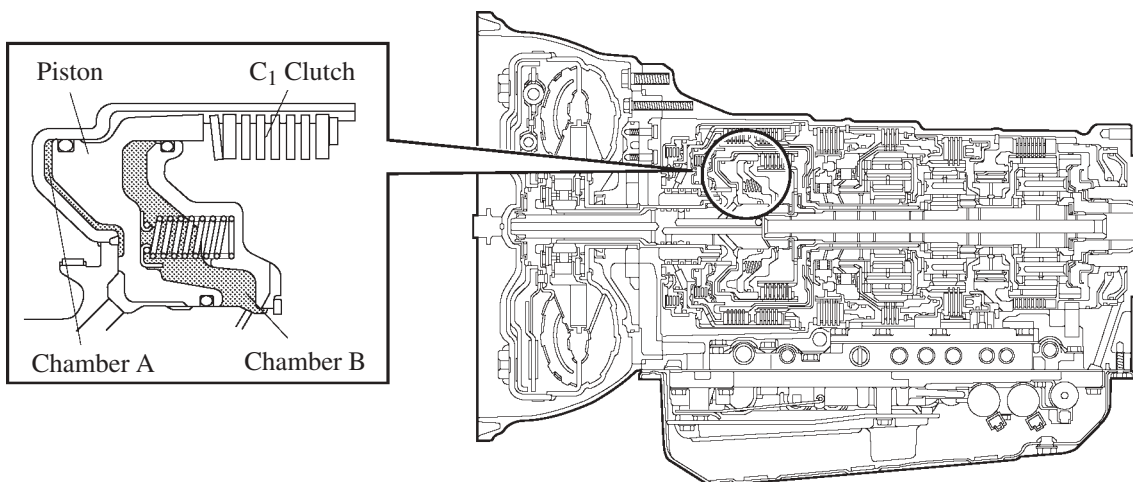
2nd Gear (2nd Position)**3rd Gear (3rd Position)****Reverse Gear (R Position)**

Centrifugal Fluid Pressure Canceling Mechanism

There are two reasons for improving the conventional clutch mechanism:

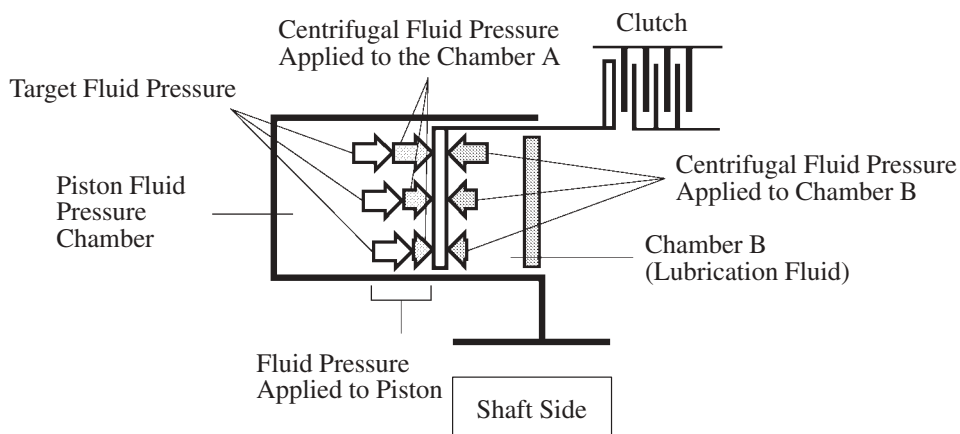
- To prevent the generation of pressure by centrifugal force applied to the fluid in the piston fluid pressure chamber (hereafter referred to as “chamber A”) when the clutch is released, a check ball is provided. Therefore, before the clutch could be subsequently applied, it took time to fill chamber A.
- During shifting, in addition to the original clutch pressure that is controlled by the valve body, centrifugal pressure acts on the fluid in the chamber A exerting increased pressure depending on RPM.

To address these two needs for improvement, a canceling fluid pressure chamber (hereafter referred to as “chamber B”) has been provided opposite chamber A.



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By utilizing the lubrication fluid such as that of the shaft, the same amount of centrifugal force is applied, thus canceling the centrifugal force that is applied to the piston itself. Accordingly, it is not necessary to discharge the fluid through the use of a check ball, and a highly responsive and smooth shifting characteristic has been achieved.



157CH17

Fluid pressure applied to piston	—	Centrifugal fluid pressure applied to chamber B	=	Target fluid pressure (original clutch pressure)
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