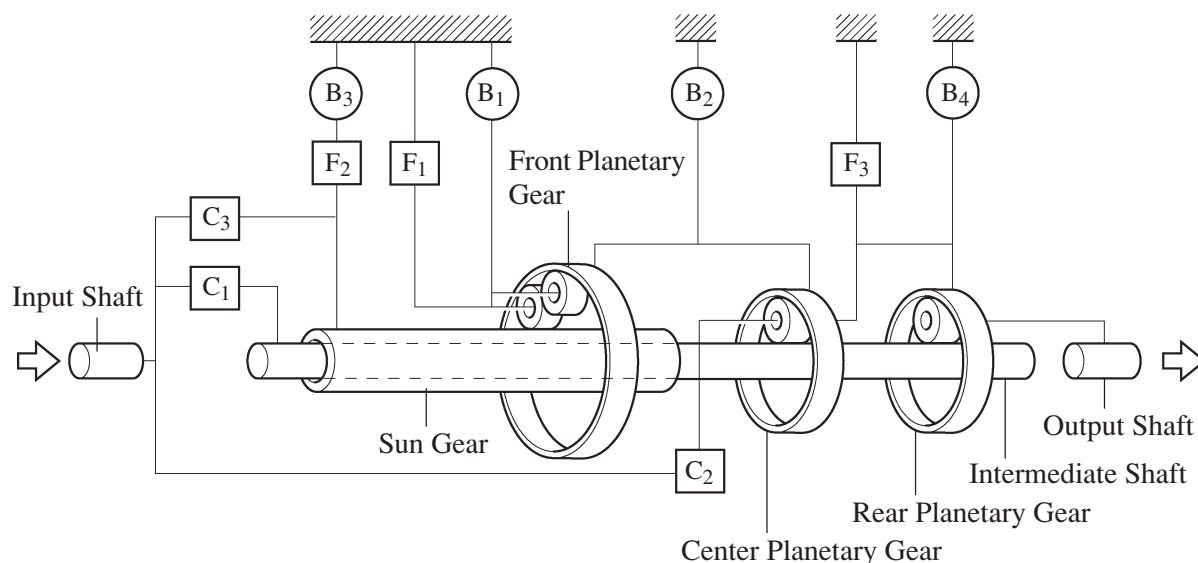


PLANETARY GEAR UNIT

1. Construction

- The 5-speed configuration has been achieved using 3 (front, center, and rear) planetary gears, thus creating a 5-speed automatic transmission.
- The front planetary carrier, made of aluminum, has been adopted to reduce the weight.
- A centrifugal fluid pressure canceling mechanism has been adopted in the C_1 , C_2 , and C_3 clutches that are applied when shifting from 2nd to 3rd, from 3rd to 4th and from 4th to 5th. For details, refer to [page CH-10](#).



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2. 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.

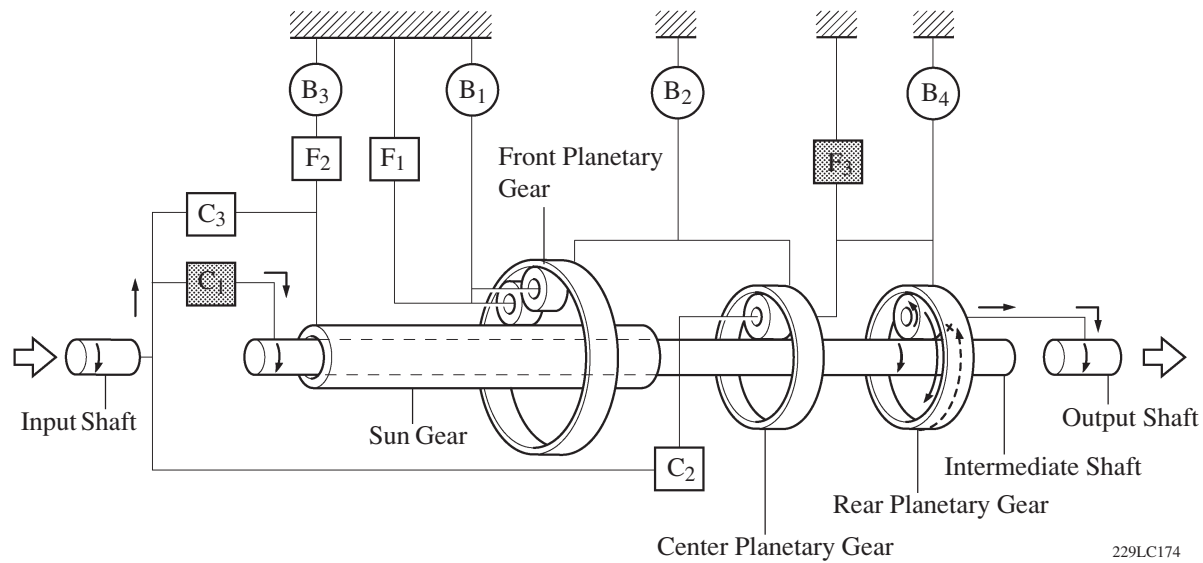
3. Transmission Power Flow

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		○	○	●			●				
	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						○						○			

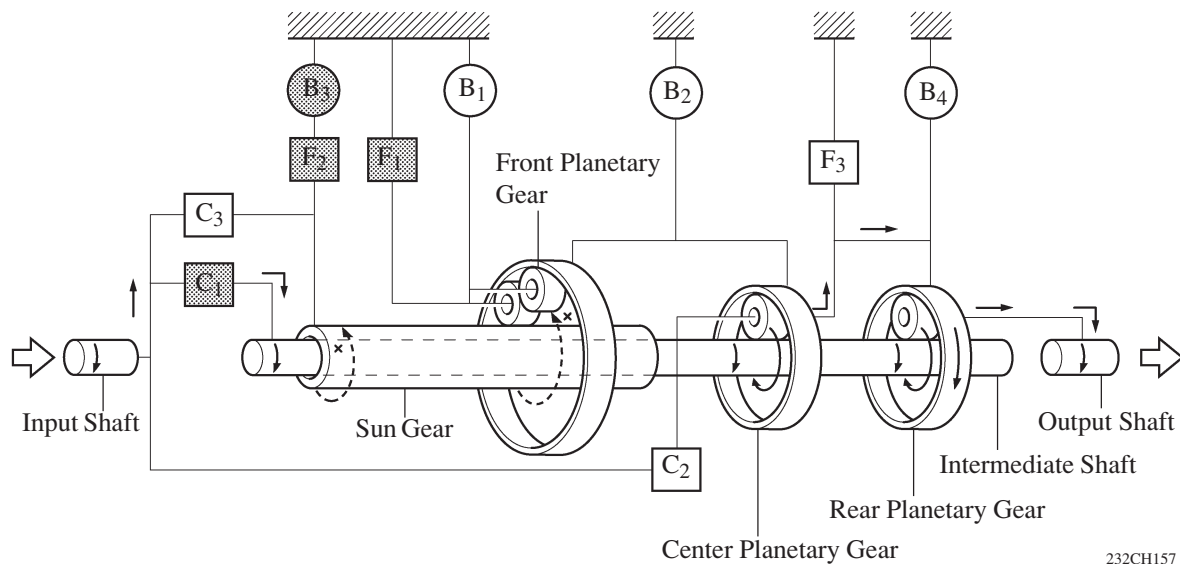
○: Operation

●: Operate but is not related to power transmission

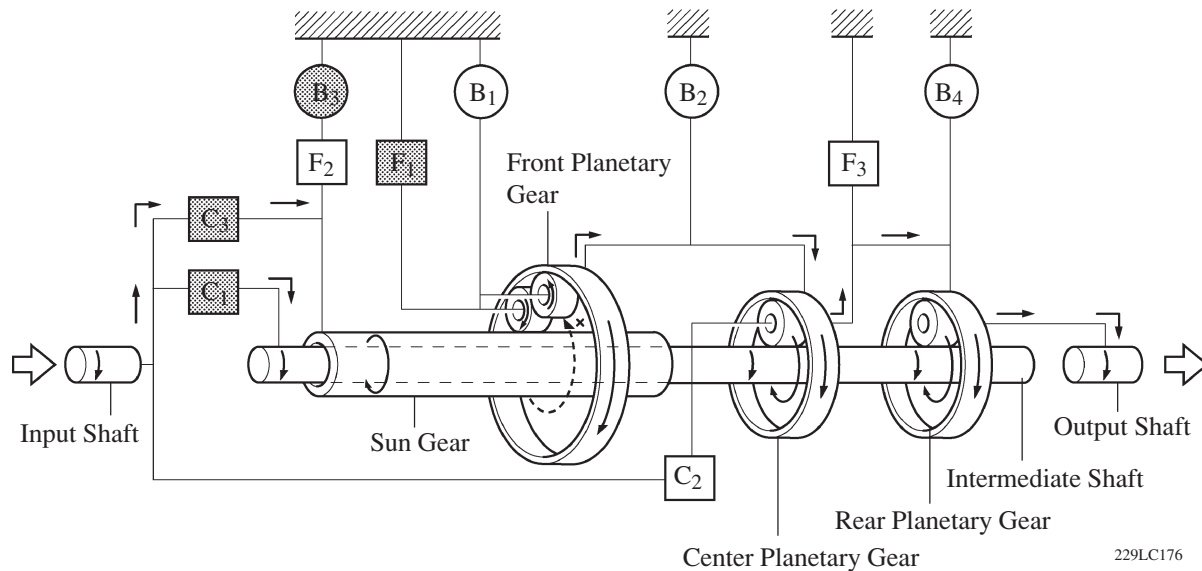
*: with engine brake

1st Gear (D Position)

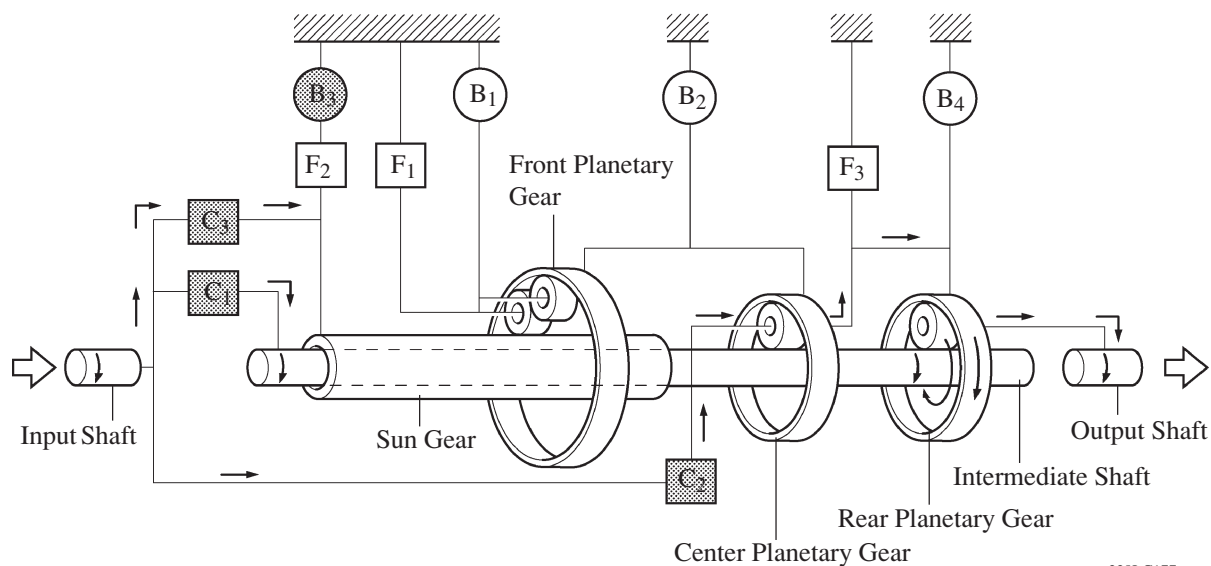
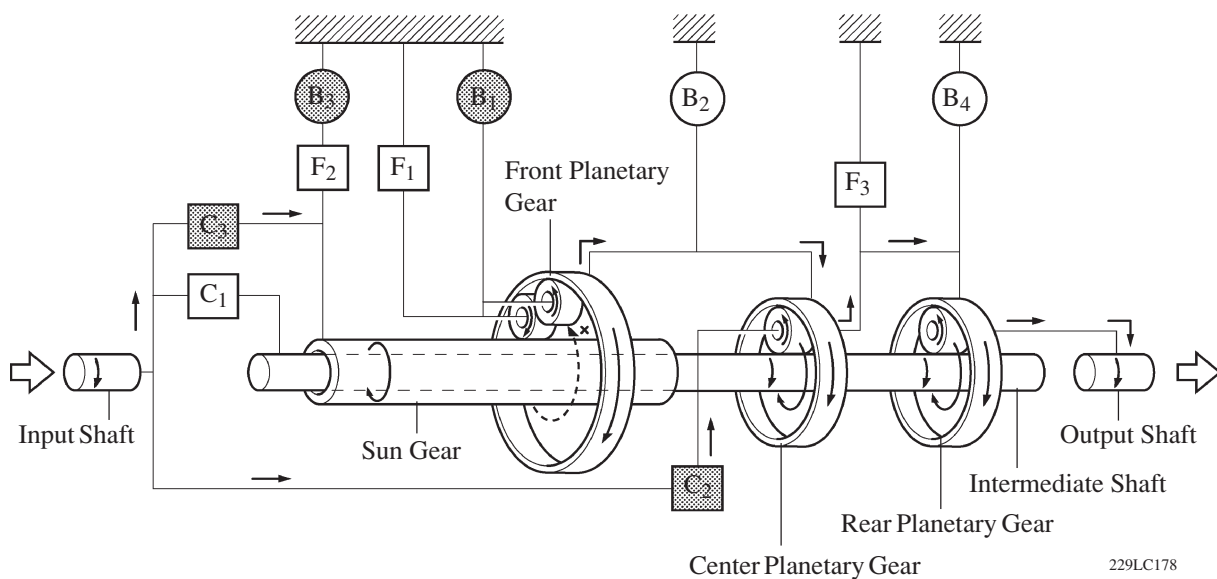
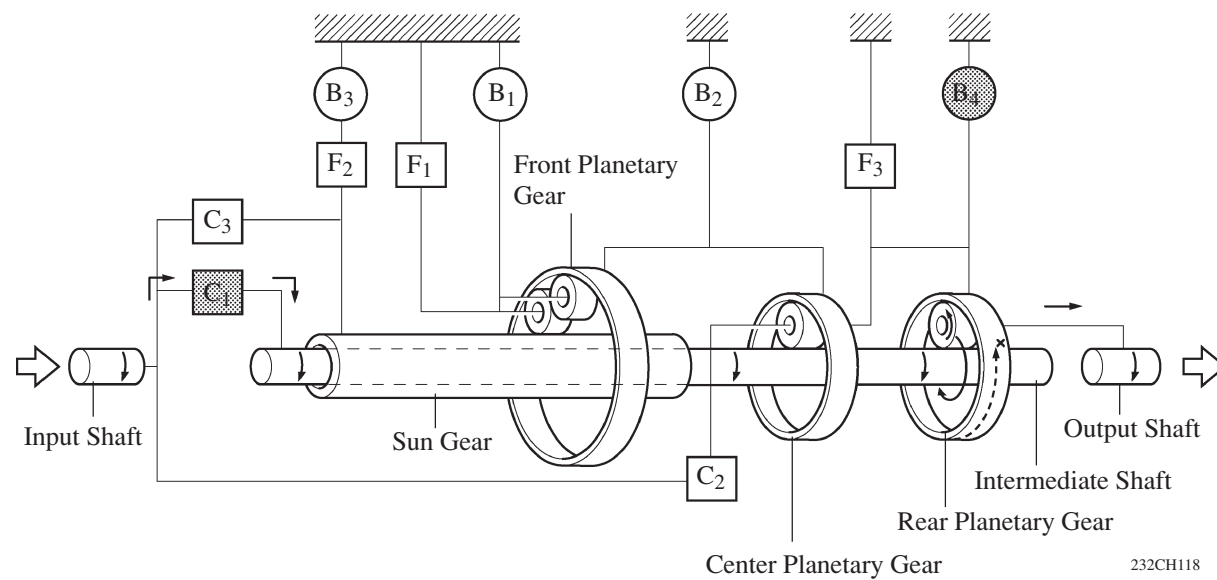
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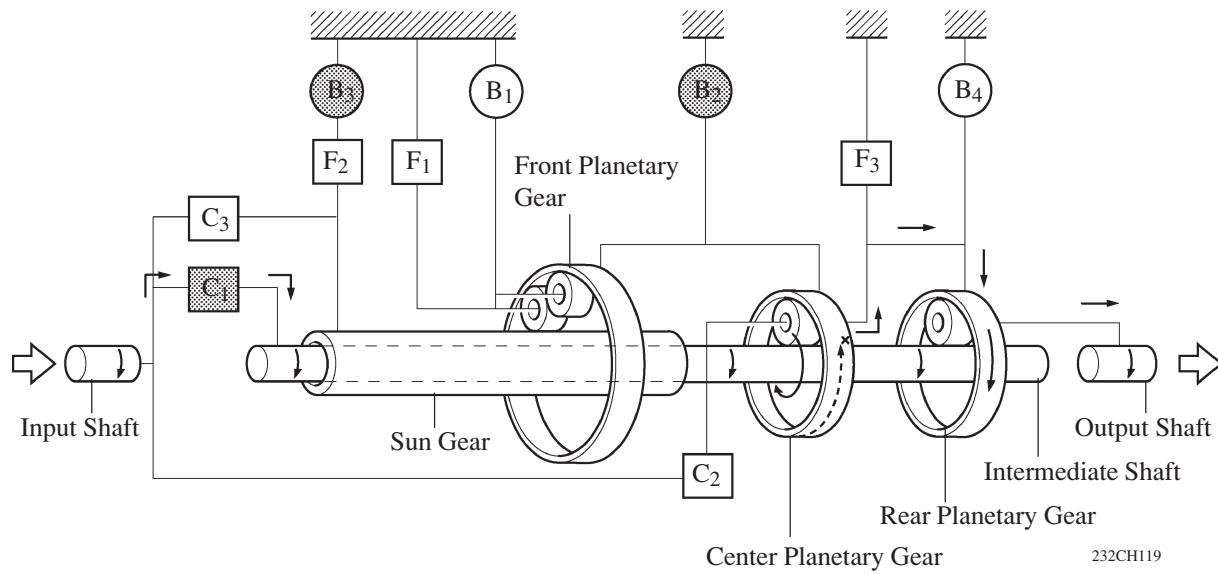
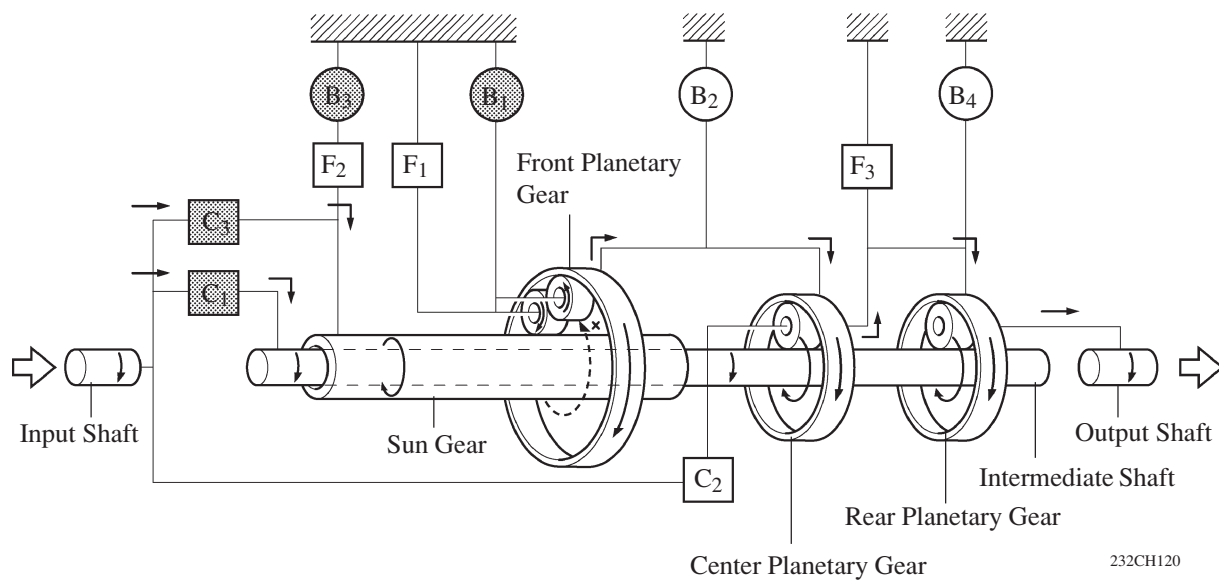
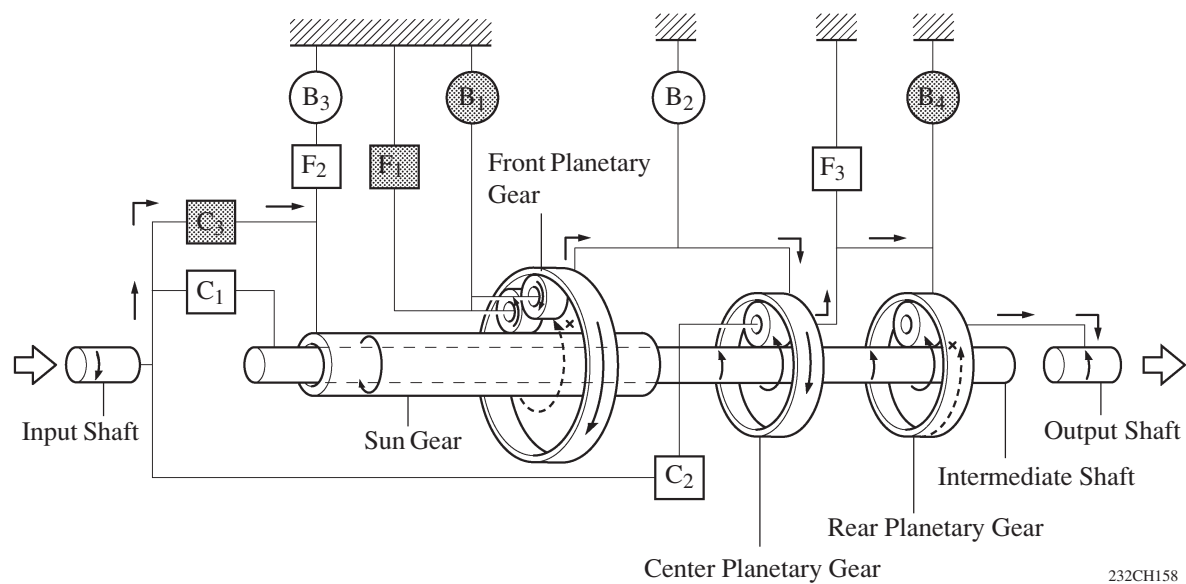
2nd Gear (D Position)

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3rd Gear (D Position)

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4th Gear (D Position)**5th Gear (D Position)****1st Gear (L Position)**

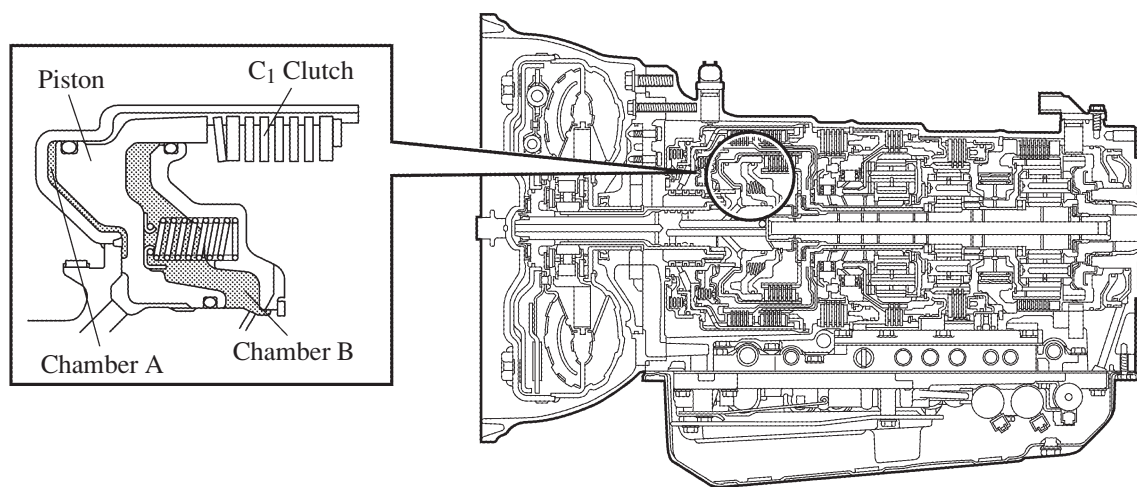
2nd Gear (2nd Position)**3rd Gear (3rd Position)****Reverse Gear (R Position)**

4. Centrifugal Fluid Pressure Canceling Mechanism

There are two reasons for improving the conventional clutch mechanism:

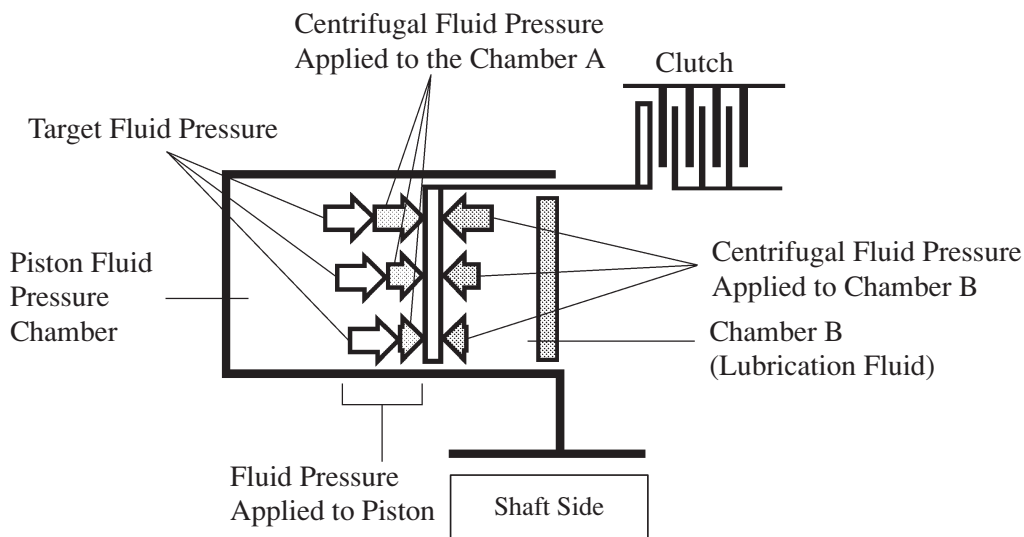
- To prevent the generation of pressure by centrifugal force applied to the fluid in the piston fluid pressure chamber (hereafter referred to as “chamber A”) when the clutch is released, a check ball is provided. Therefore, before the clutch could be subsequently applied, it took time to fill chamber 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 upon revolution fluctuations.

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.



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