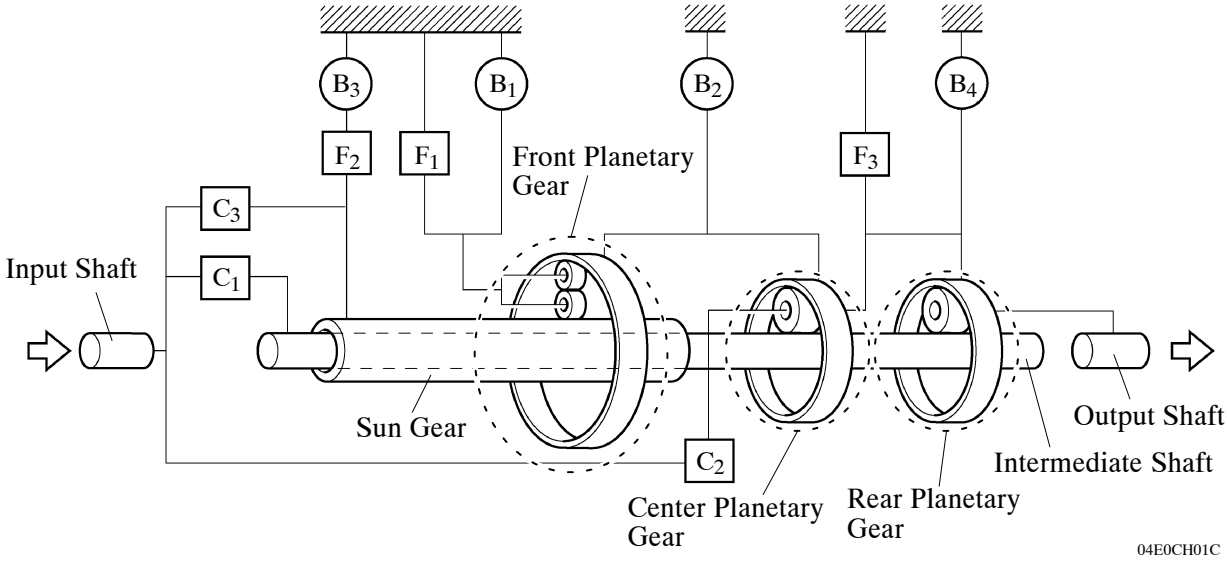
■PLANETARY GEAR UNIT

1. Construction

The planetary gear unit consists of three planetary gear units, three clutches, four brakes, and three one-way clutches.

- A centrifugal fluid pressure canceling mechanism is used in the C_1, C_2, and C_3 clutches that are applied when shifting from 2nd → 3rd, 3rd → 4th, and 4th → 5th. For details, see page CH-22.



2. Function of Components

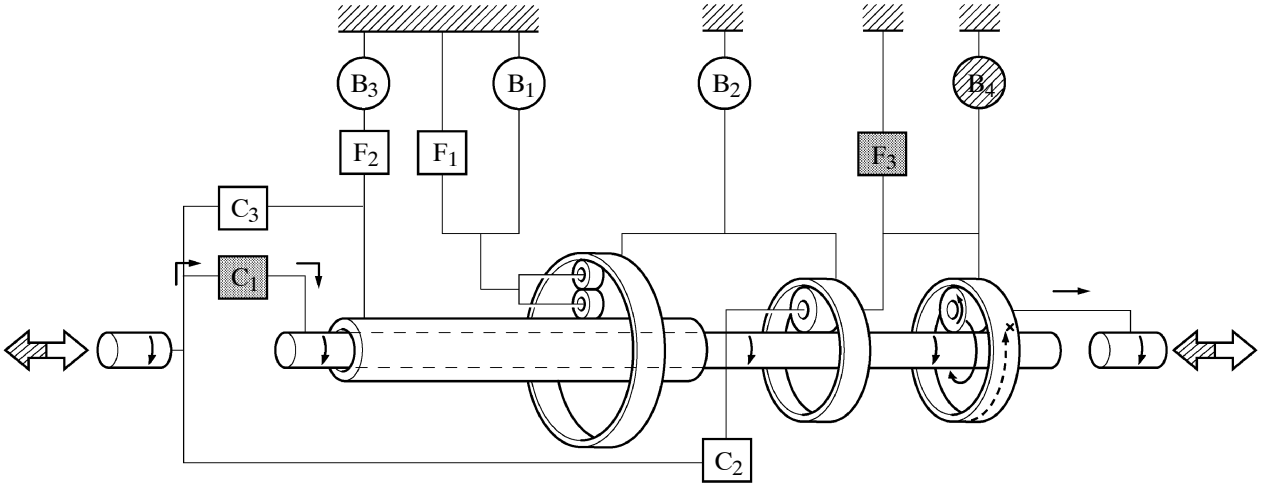
Components		Function
C_1	No.1 Clutch	Connects the input shaft and intermediate shaft.
C_2	No.2 Clutch	Connects the input shaft and center planetary carrier.
C_3	No.3 Clutch	Connects the input shaft and front sun gear.
B_1	No.1 Brake	Prevents the front planetary carrier from turning either clockwise or counterclockwise.
B_2	No.2 Brake	Prevents the front and center ring gear from turning either clockwise or counterclockwise.
B_3	No.3 Brake	Prevents the outer race of F_2 from turning either clockwise or counterclockwise.
B_4	No.4 Brake	Prevents the center planetary carrier and rear ring gear from turning either clockwise or counterclockwise.
F_1	No.1 One-way Clutch	Prevents the front planetary carrier from turning counterclockwise.
F_2	No.2 One-way Clutch	When B_3 is operating, this one-way clutch prevents the front planetary sun gear from turning counterclockwise.
F_3	No.3 One-way Clutch	Prevents the 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		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		ON				ON											
R*		ON				ON				○	Δ			○	○		
N		ON				ON											
D, S5	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○			●		○		
	4th*					ON		○	○	●			●				
	5th*			ON	ON		ON		○	○	○		●				
S4	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○			●		○		
	4th*					ON	ON	○	○	●			●				
S3	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd*		ON					○		○	Δ		●		○		
S2	1st	ON				ON		○									○
	2nd*	ON	ON	ON				○				Δ	○		○	○	
S1	1st*	ON						○						Δ			○

○: Operates
●: Operates but is not related to power transmission
Δ: Operates during engine braking
*: with engine brake

1st Gear (D Position or S Mode)

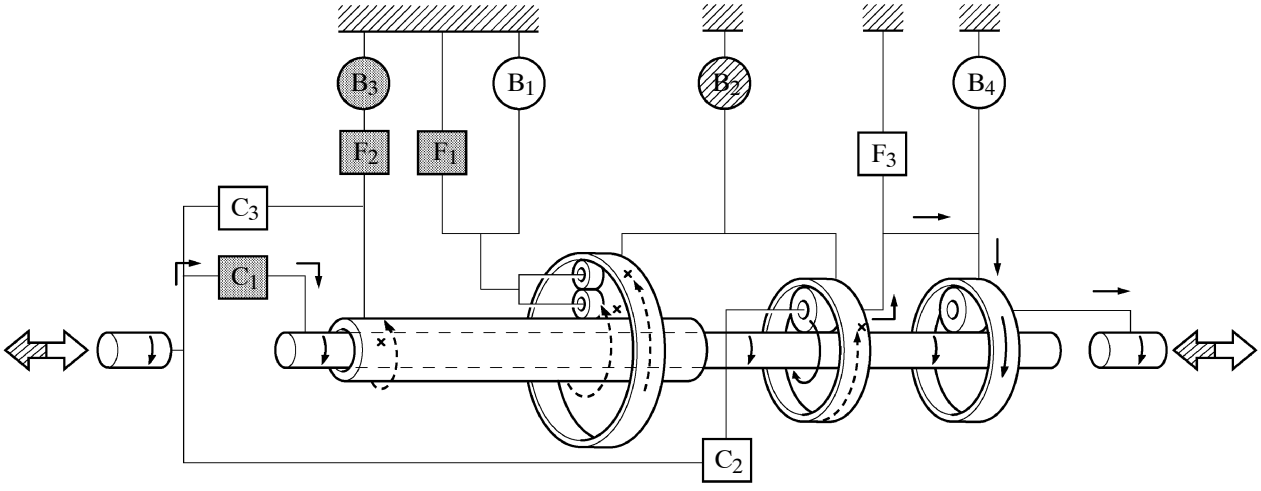


: Operates

: Operates only in the S1 range

04E0CH02C

2nd Gear (D Position or S Mode)

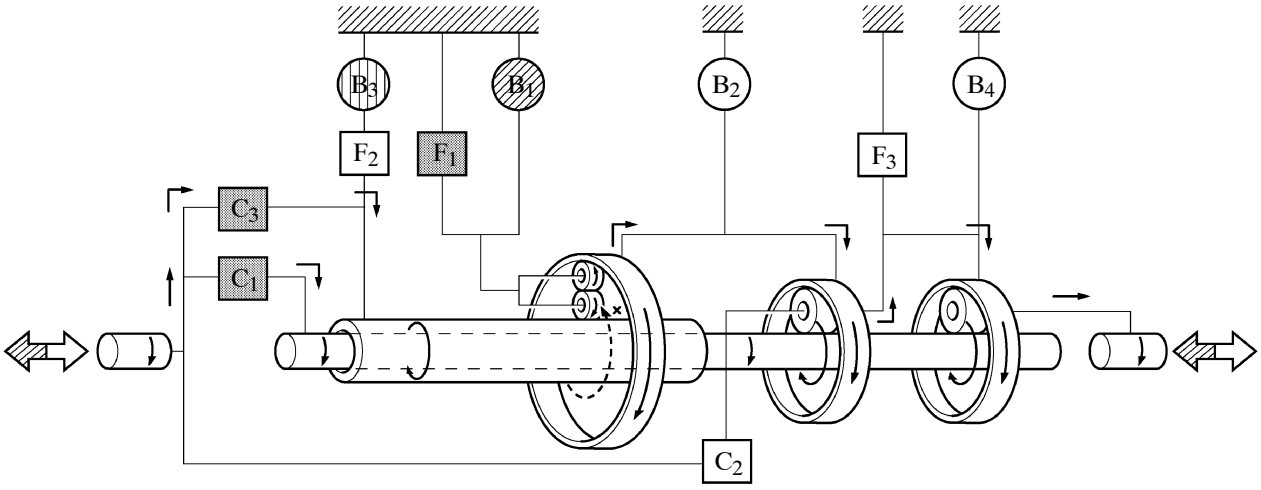


: Operates

: Operates only in the S2 range

04E0CH03C

3rd Gear (D Position or S Mode)



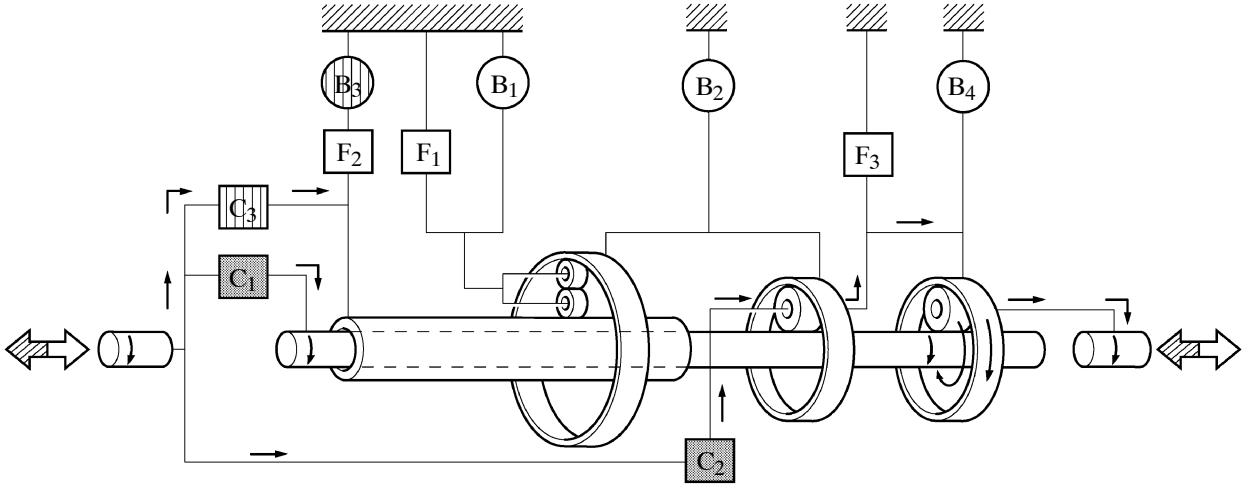
: Operates

: Operates only in the S3 range

: Operates but is not related to power transmission

04E0CH04C

4th Gear (D Position or S mode)

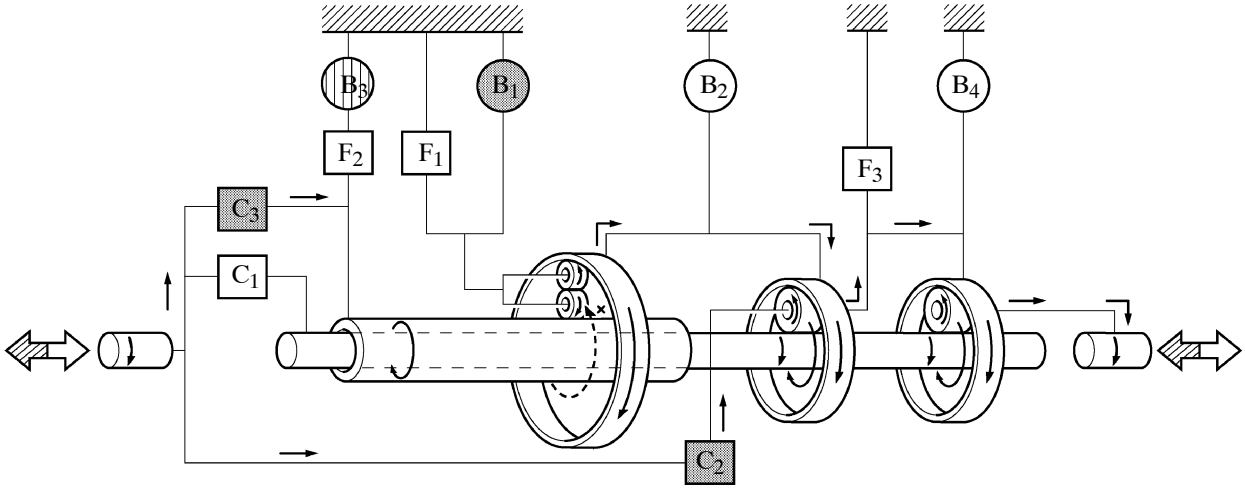


: Operates

: Operates but is not related to power transmission

04E0CH05C

5th Gear (D Position or S Mode)

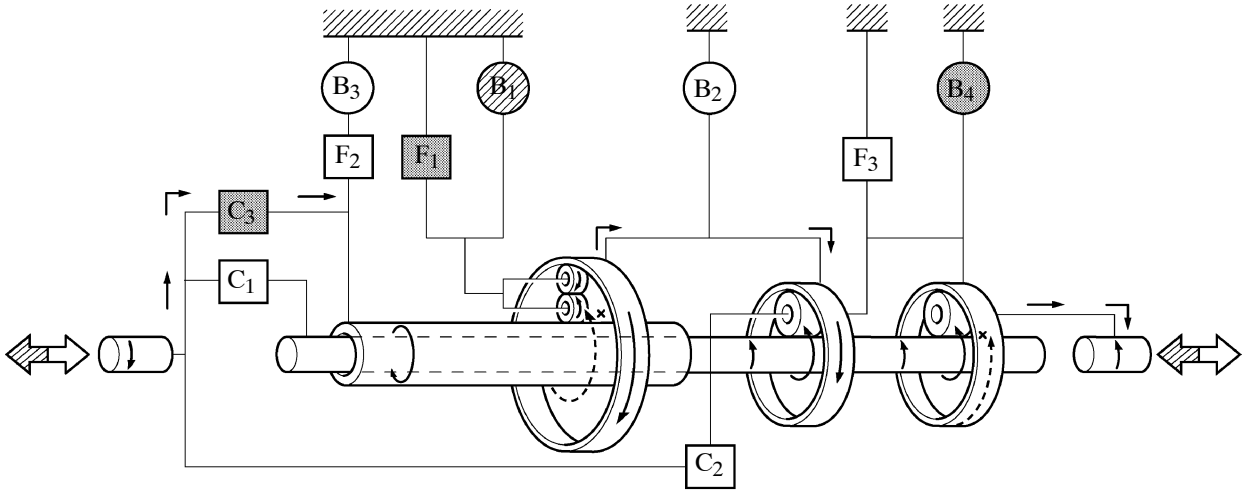


: Operates

: Operates but is not related to power transmission

04E0CH06C

Reverse Gear (R Position)



: Operates

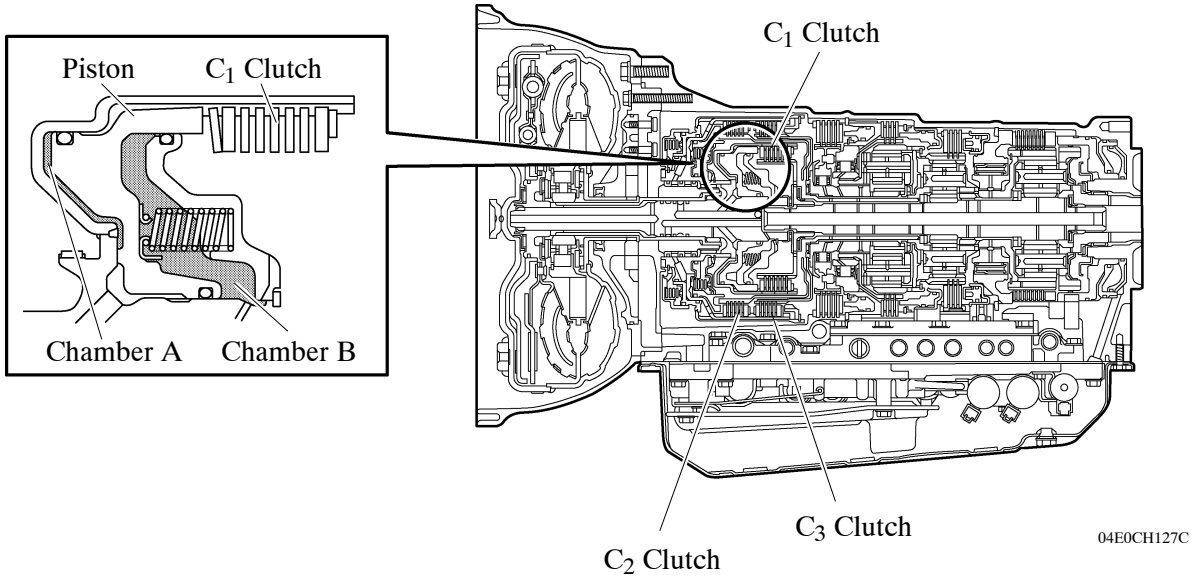
: Operates during engine braking

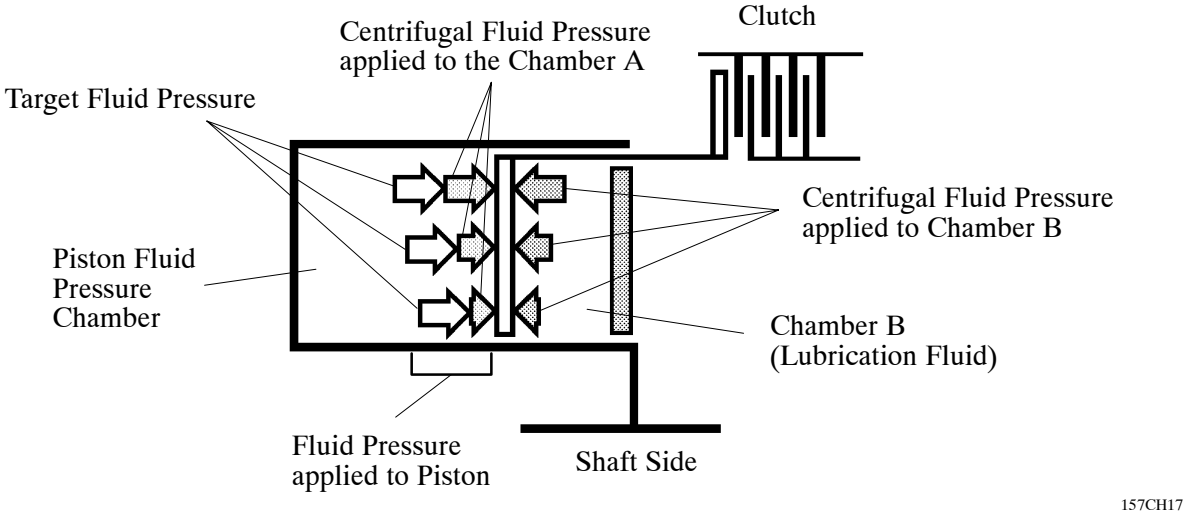
04E0CH07C

4. Centrifugal Fluid Pressure Canceling Mechanism

For the following reason, the centrifugal fluid pressure canceling mechanism is used on the C_1, C_2, and C_3 clutches.

- Clutch shifting operation is affected not only by the valve body controlling fluid pressure but also by centrifugal fluid pressure that is present due to fluid in the clutch piston oil pressure chamber. The centrifugal fluid pressure canceling mechanism has chamber B to reduce this affect applied to the chamber A. As a result, smooth shifting with excellent response has been achieved.





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