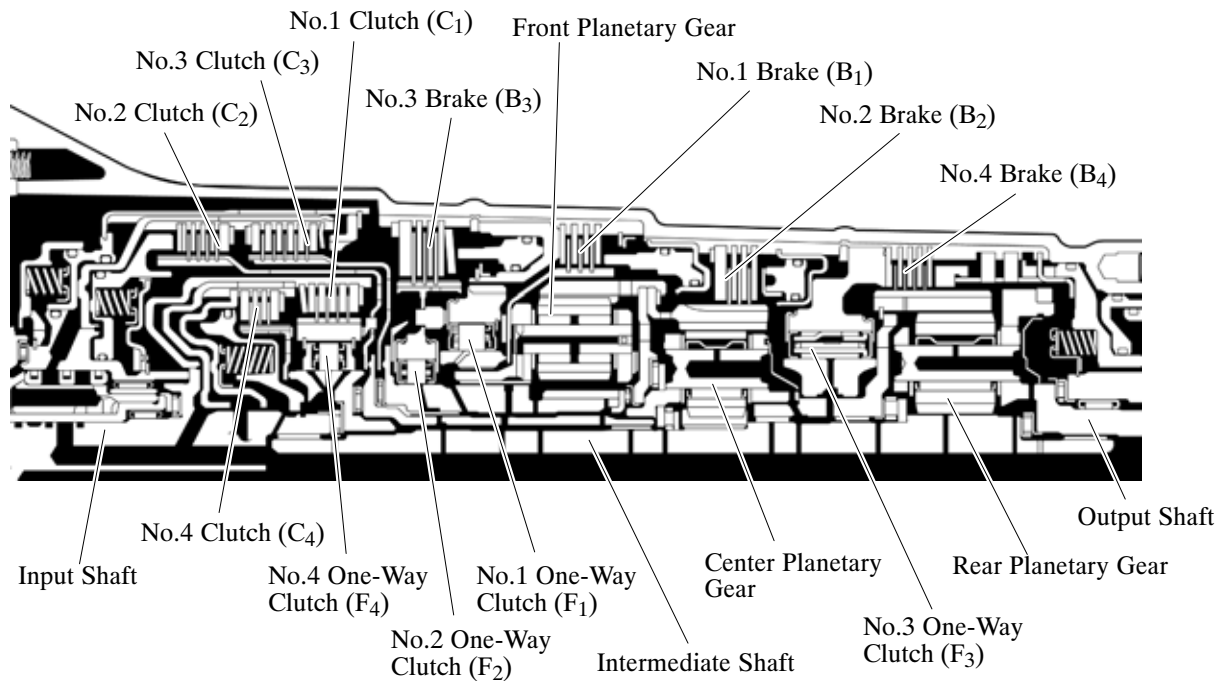


PLANETARY GEAR UNIT

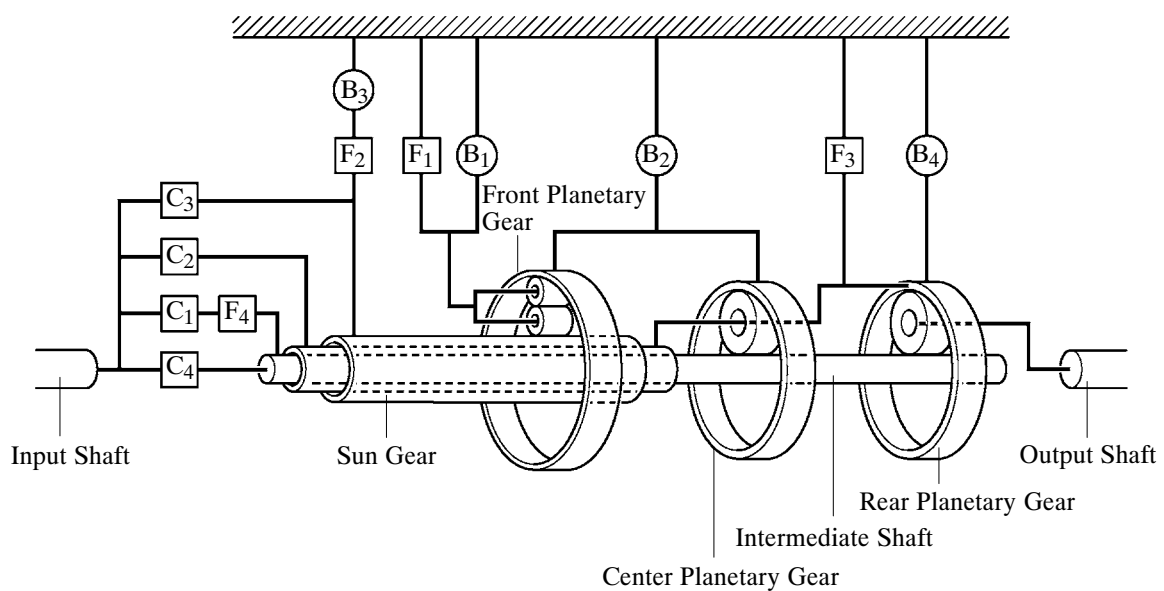
1. Construction

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

- A centrifugal fluid pressure canceling mechanism is used in the C₁, C₂, C₃, and C₄ clutches that are applied when shifting 2nd → 3rd, 3rd → 4th, 4th → 5th, and 5th → 6th. For details, [refer to page CH-24](#).



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2. Function of Component

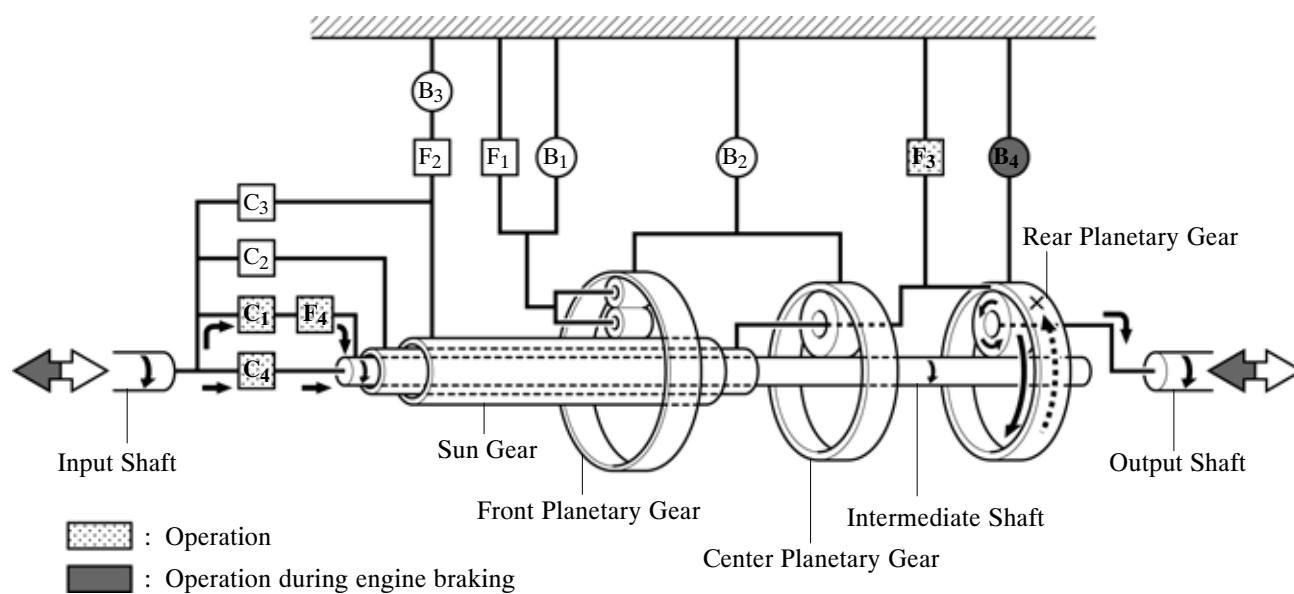
Component		Function
C ₁	No.1 Clutch	Connects the input shaft, F ₄ and intermediate shaft.
C ₂	No.2 Clutch	Connects the input shaft and center planetary carrier.
C ₃	No.3 Clutch	Connects the input shaft and sun gear.
C ₄	No.4 Clutch	Connects the input shaft and intermediate shaft.
B ₁	No.1 Brake	Prevents the front planetary carrier from turning either clockwise or counterclockwise.
B ₂	No.2 Brake	Prevents the front and the center ring gear from turning either clockwise or counterclockwise.
B ₃	No.3 Brake	Prevents outer race of F ₂ from turning both clockwise and counterclockwise.
B ₄	No.4 Brake	Prevents center planetary carrier and the 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, the one way clutch prevents the front sun gear from turning counterclockwise.
F ₃	No.3 One-Way Clutch	Prevents the center planetary carrier and the rear ring gear from turning counterclockwise.
F ₄	No.4 One-Way Clutch	Prevents the intermediate shaft 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 output shaft speed.

3. Transmission Power Flow

Shift Lever Position		Solenoid Valve							Clutch				Brake				One-way Clutch				
		S1	S2	S3	S4	SR	SL1	SL2	SLU	C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
P			ON	ON		ON		ON													
R*			ON	ON		ON		ON			○			○			○	○			
N			ON	ON		ON		ON													
D, S6	1st		ON	ON		ON		ON		○			○							○	○
	2nd	ON	ON	ON		ON		ON	ON	○			○			○		○	○		○
	3rd	ON		ON		ON		ON	ON	○		○	○			●		○			○
	4th*	ON				ON		ON	ON	○	○	●	○			●					○
	5th*	ON			ON		ON		ON	●	○	○		○		●					
	6th*	ON	ON		ON		ON		ON	●	○			●	○	●					
S5	1st		ON	ON		ON		ON		○			○							○	○
	2nd	ON	ON	ON		ON		ON	ON	○			○			○		○	○		○
	3rd	ON		ON		ON		ON	ON	○		○	○			●		○			○
	4th*	ON				ON		ON	ON	○	○	●	○			●					○
	5th*	ON			ON		ON		ON	●	○	○		○		●					
S4	1st		ON	ON		ON		ON		○			○							○	○
	2nd	ON	ON	ON		ON		ON	ON	○			○			○		○	○		○
	3rd	ON		ON		ON		ON	ON	○		○	○			●		○			○
	4th*	ON				ON		ON	ON	○	○	●	○			●					○
S3	1st		ON	ON		ON		ON		○			○							○	○
	2nd	ON	ON	ON		ON		ON		○			○			○		○	○		○
	3rd*	ON		ON		ON				○		○	○	(○)		●		○			○
S2	1st		ON	ON		ON		ON		○			○							○	○
	2nd*	ON	ON	ON	ON	ON				○			○		(○)	○		○	○		○
S1	1st*		ON	ON		ON				○			○				(○)			○	○

○: Operation ●: Operate but is not related to power transmission

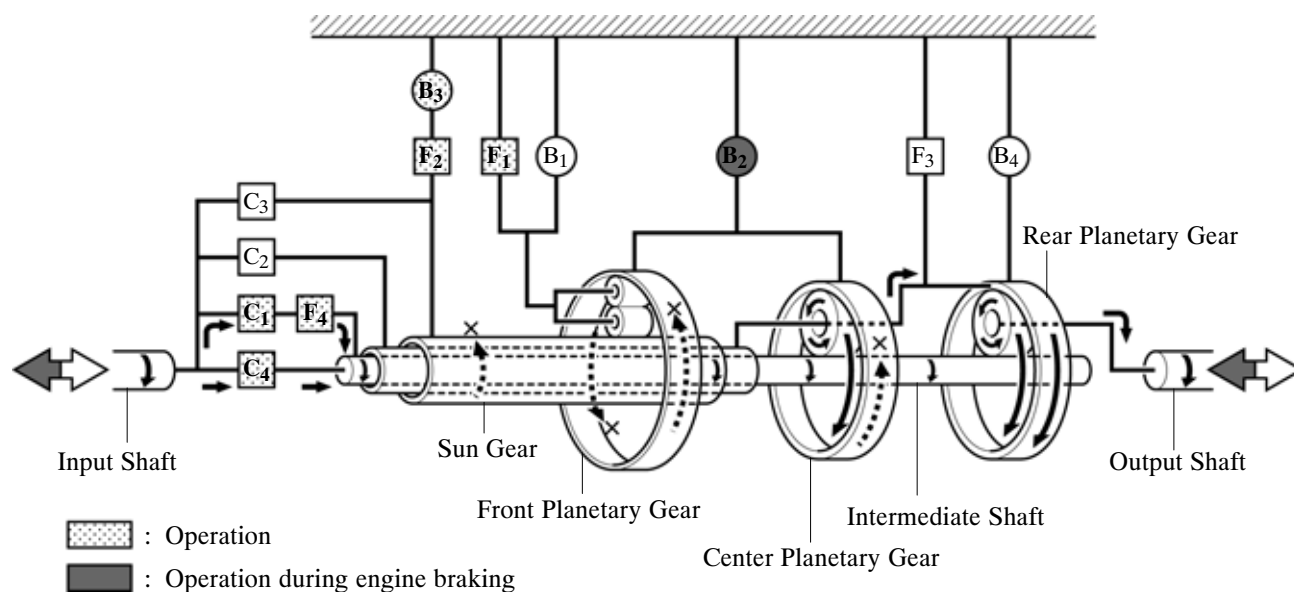
(○): Operation during engine braking *: with Engine Brake

1st Gear (D Position or S Mode)

040SC03C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
○			○				(○)			○	○

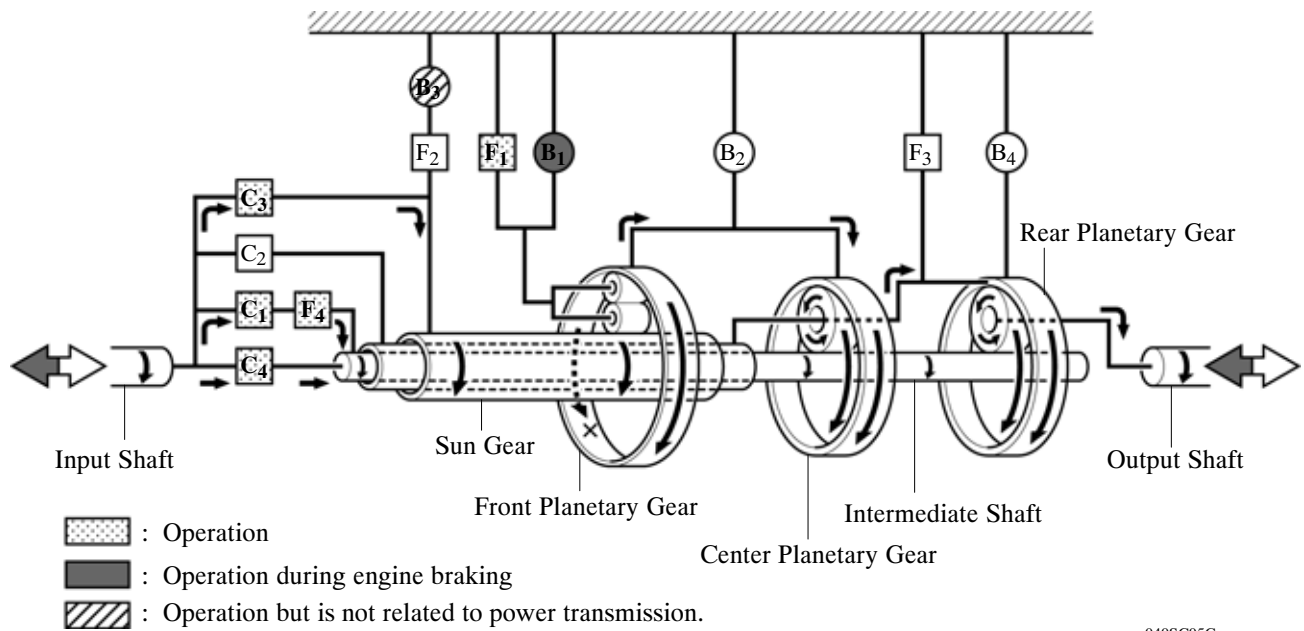
○: Operation (○): Operation during engine braking (only in the S mode [1st])

2nd Gear (D Position or S Mode)

040SC04C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
○			○		(○)	○		○	○		○

○: Operation (○): Operation during engine braking (only in the S mode [2nd])

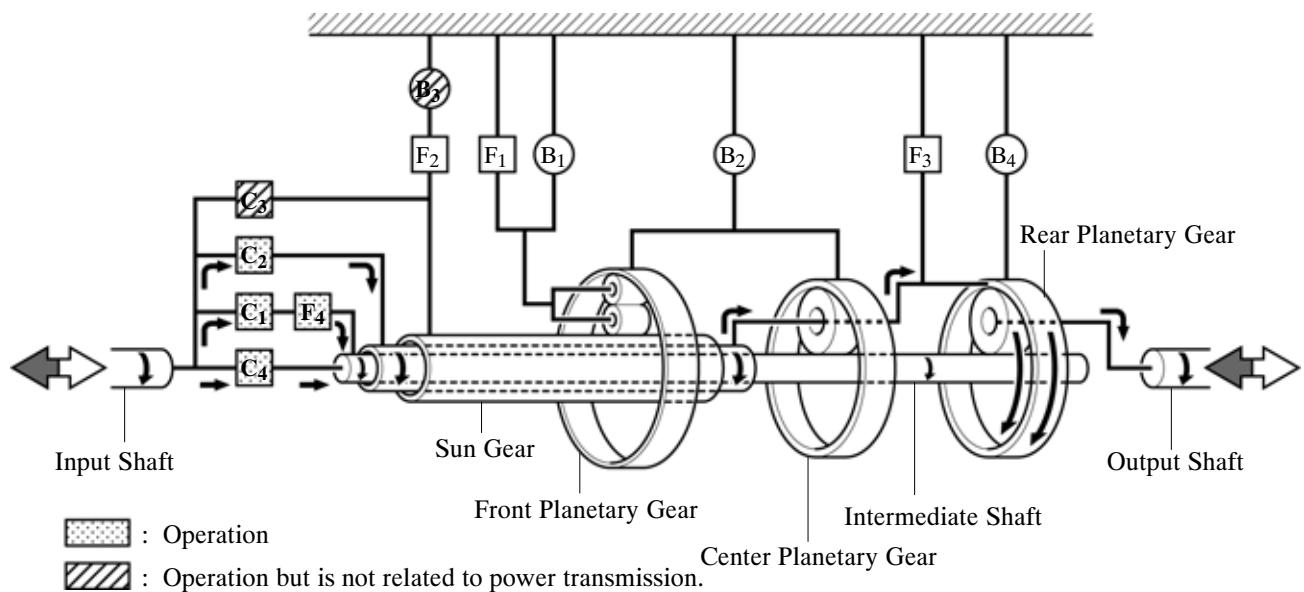
3rd Gear (D Position or S Mode)

040SC05C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
○		○	○	(○)		Δ		○			○

○: Operation (○): Operation during engine braking (only in the S mode [3rd])

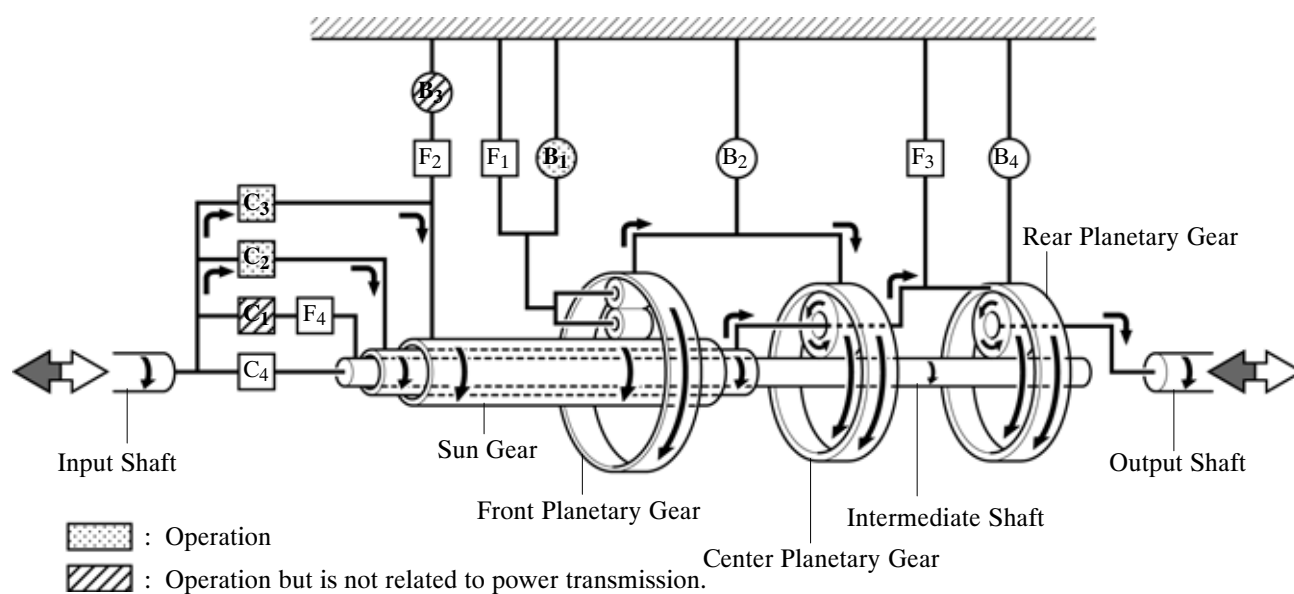
Δ: Operation but is not related to power transmission

4th Gear (D Position or S Mode)

040SC06C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
○	○	Δ	○			Δ					○

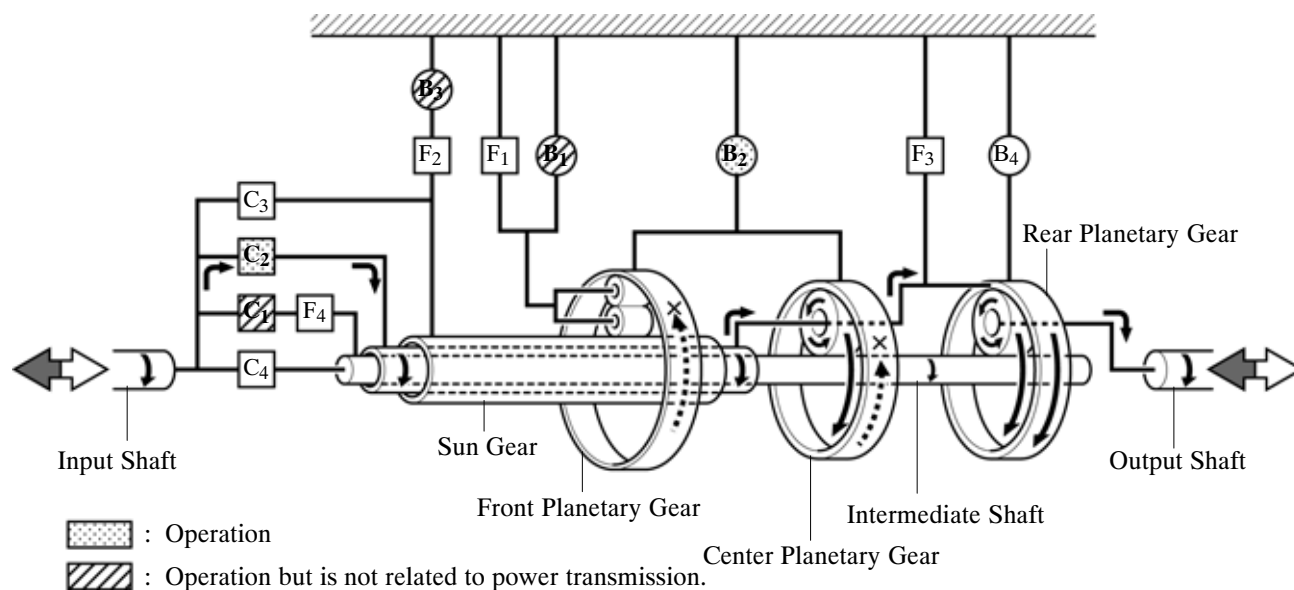
○: Operation Δ: Operation but is not related to power transmission

5th Gear (D Position or S Mode)

040SC07C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
Δ	○	○		○		Δ					

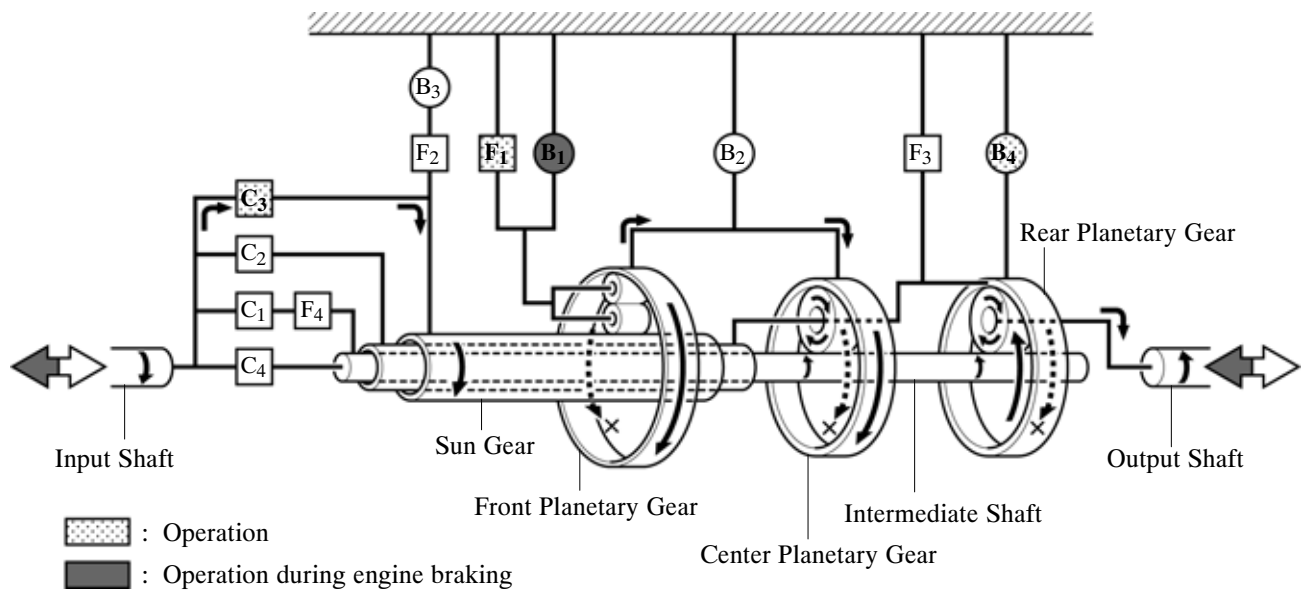
○: Operation Δ: Operation but is not related to power transmission

6th Gear (D Position or S Mode)

040SC08C

C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
Δ	○			Δ	○	Δ					

○: Operation Δ: Operation but is not related to power transmission

Reverse (R Position)

040SC09C

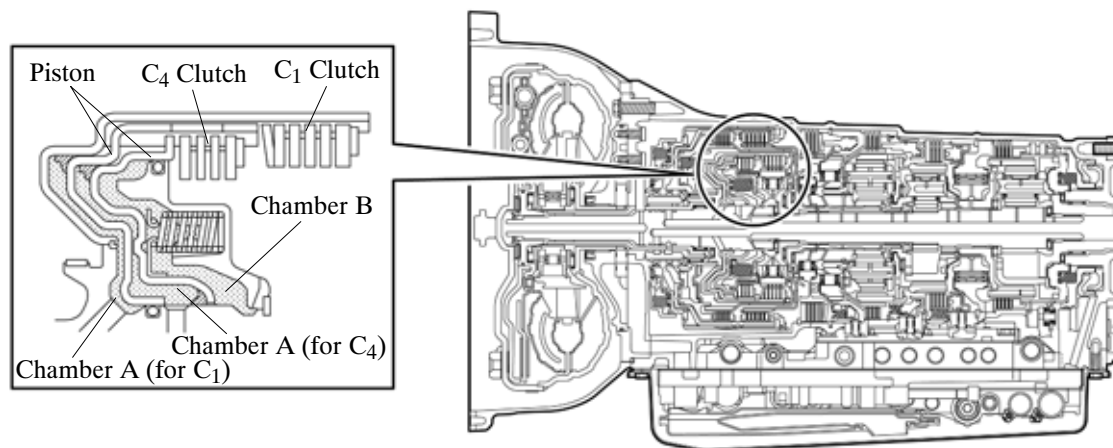
C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃	F ₄
		○		(○)			○	○			

○: Operation (○): Operation during engine braking

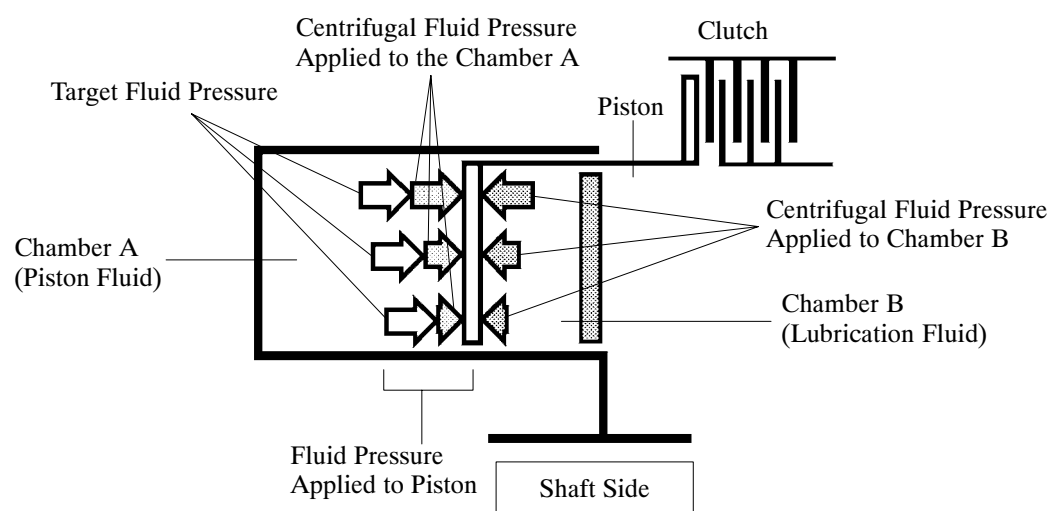
4. Centrifugal Fluid Pressure Canceling Mechanism

For the following reason, the centrifugal fluid pressure canceling mechanism is used on C₁, C₂, C₃, and C₄ clutch.

- 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.



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157CH17

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