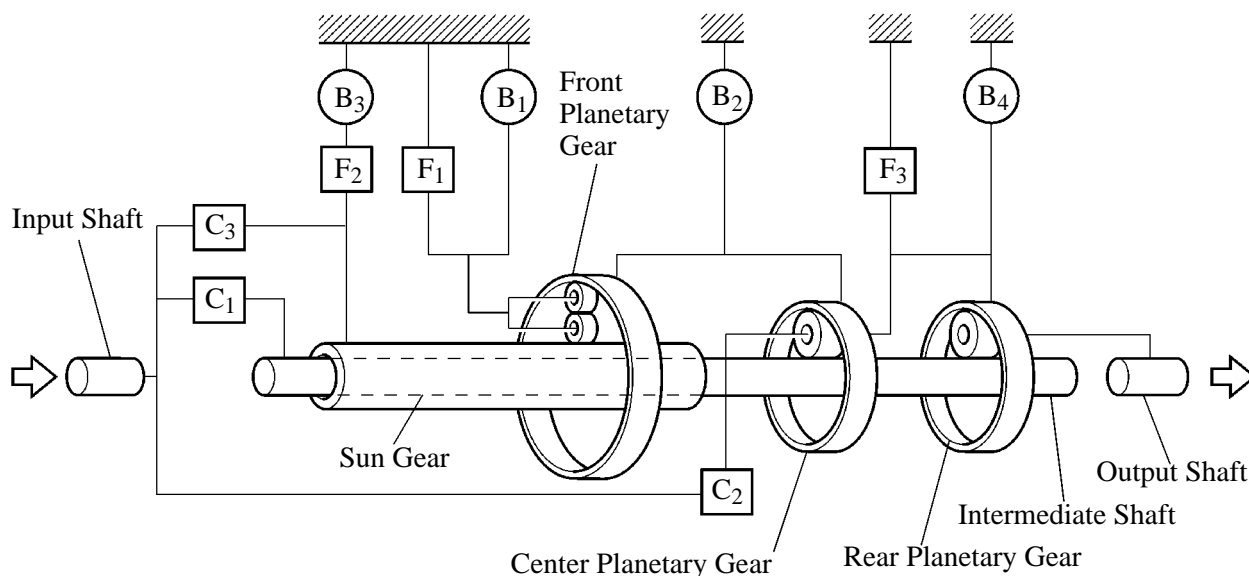


## ■ PLANETARY GEAR UNIT

## 1. Construction

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

- A front planetary carrier made of aluminum is used to reduce weight.
- A centrifugal fluid pressure canceling mechanism is used in the C<sub>1</sub>, C<sub>2</sub>, and C<sub>3</sub> clutches that are applied when shifting 2nd → 3rd, 3rd → 4th, and 4th → 5th. For details, see page CH-16.



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## 2. Function of Components

Component		Function
C <sub>1</sub>	No. 1 Clutch	Connects the input shaft and intermediate shaft.
C <sub>2</sub>	No. 2 Clutch	Connects the input shaft and center planetary carrier.
C <sub>3</sub>	No. 3 Clutch	Connects the input shaft and front sun gear.
B <sub>1</sub>	No. 1 Brake	Prevents the front planetary carrier from turning either clockwise or counterclockwise.
B <sub>2</sub>	No. 2 Brake	Prevents the front and center ring gears from turning either clockwise or counterclockwise.
B <sub>3</sub>	No. 3 Brake	Prevents the outer race of F <sub>2</sub> from turning either clockwise or counterclockwise.
B <sub>4</sub>	No. 4 Brake	Prevents the center planetary carrier and rear ring gear from turning either clockwise or counterclockwise.
F <sub>1</sub>	No. 1 One-way Clutch	Prevents the front planetary carrier from turning counterclockwise.
F <sub>2</sub>	No. 2 One-way Clutch	When B <sub>3</sub> is operating, this one-way clutch prevents the front planetary sun gear from turning counterclockwise.
F <sub>3</sub>	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

#### General

Shift Lever or Gear Range Position		Solenoid Valve						Clutch			Brake				One-way Clutch		
		S1	S2	SR	SL1	SL2	SLU	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
P		ON				ON											
R*		ON				ON				○	(○)			○	○		
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					○		○	(○)		●		○		
S2	1st	ON				ON		○									○
	2nd*	ON	ON	ON				○				(○)	○		○	○	
S1	1st*	ON						○						(○)			○

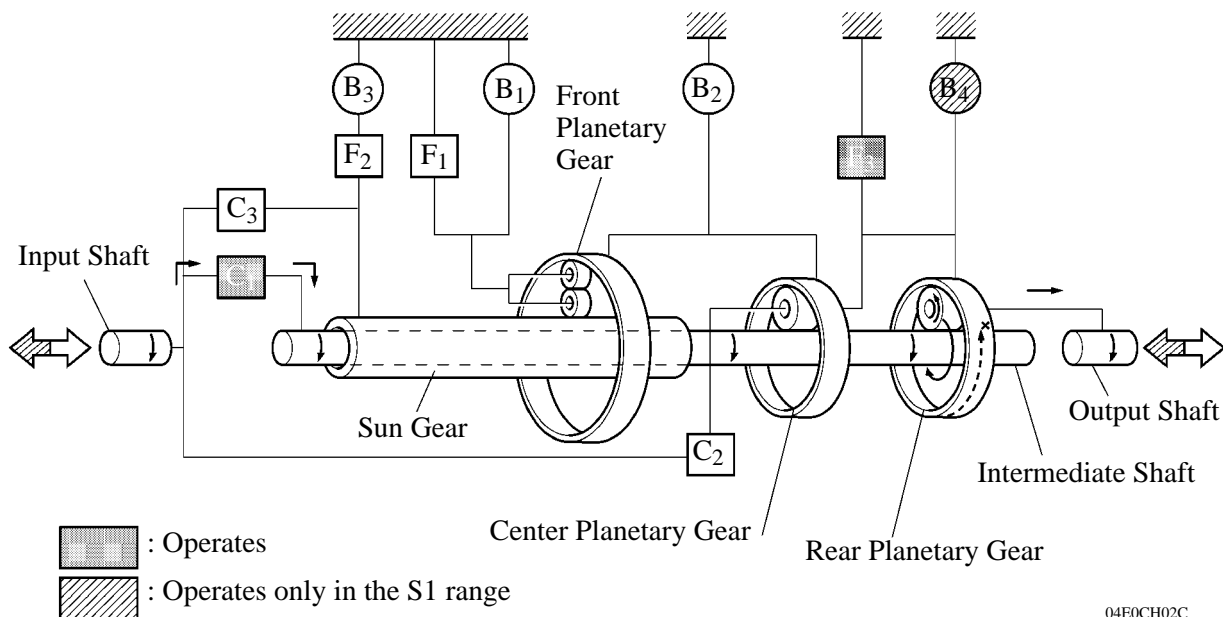
○: Operates

●: Operates but is not related to power transmission

(○): Operates during engine braking

\*: Engine braking occurs

### 1st Gear (D Position or S Mode)

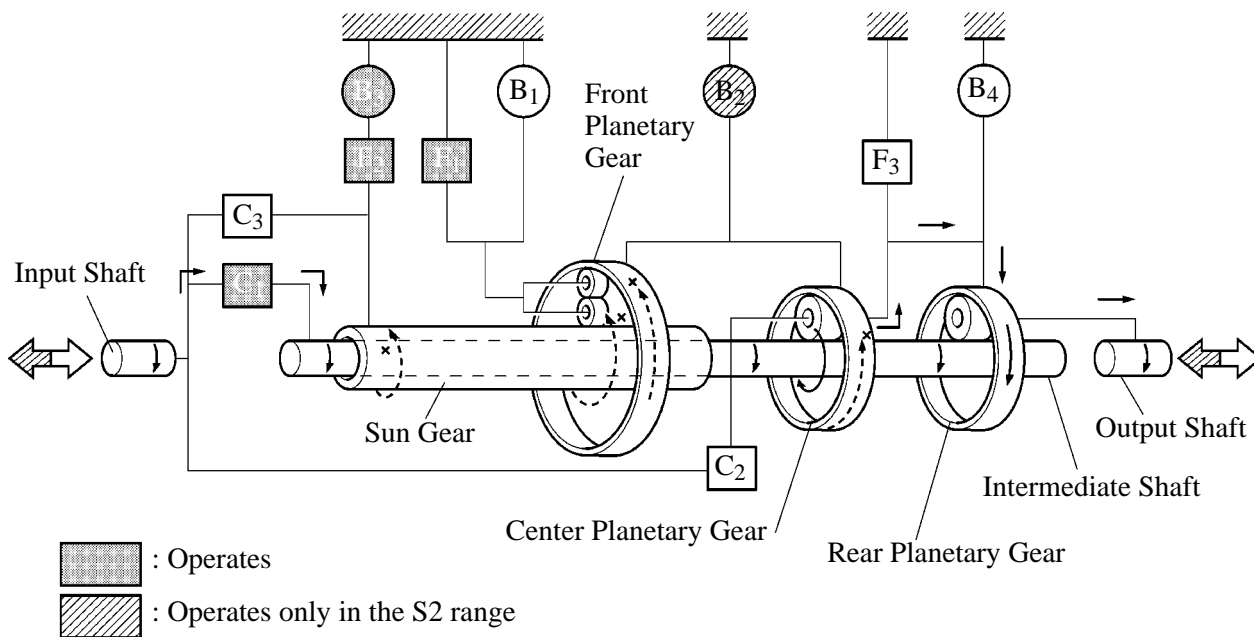


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C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
○						(○)			○

○: Operates    (○): Operates only in the S1 range

### 2nd Gear (D Position or S Mode)

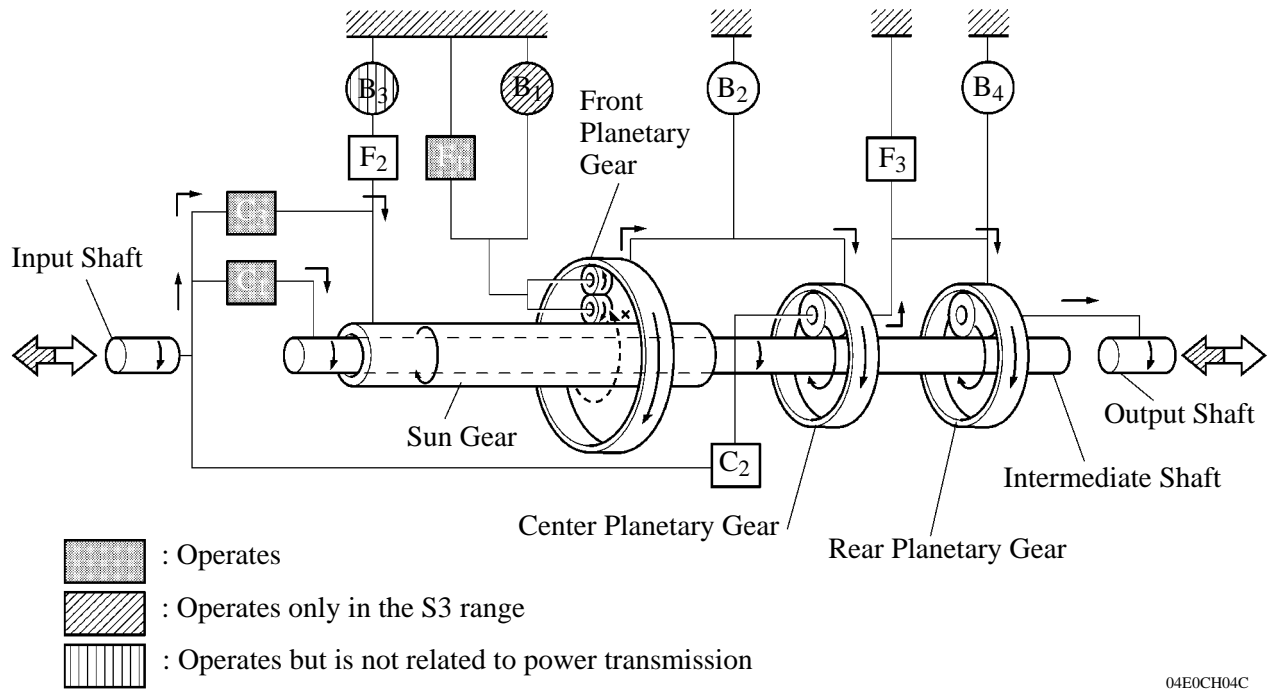


04E0CH03C

C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
○				(○)	○		○	○	

○: Operates    (○): Operates only in the S2 range

3rd Gear (D Position or S Mode)

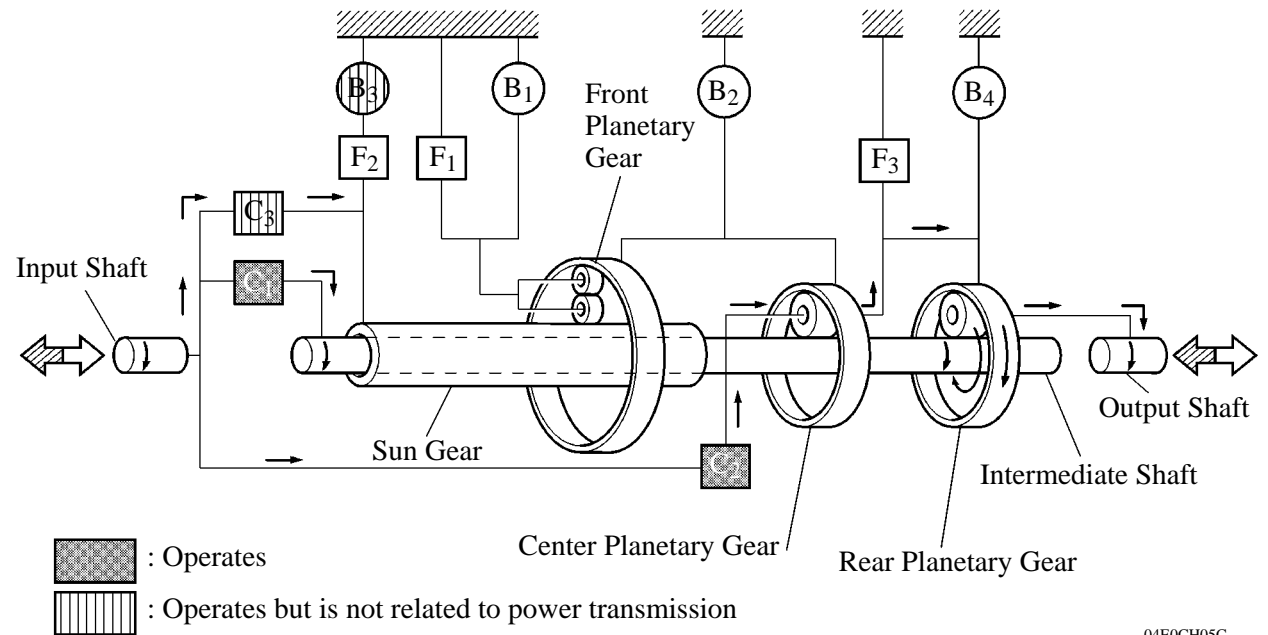


04E0CH04C

C1	C2	C3	B1	B2	B3	B4	F1	F2	F3
○		○	(○)		●		○		

○: Operates    (○): Operates only in the S3 range  
●: Operates but is not related to power transmission

4th Gear (D Position or S mode)

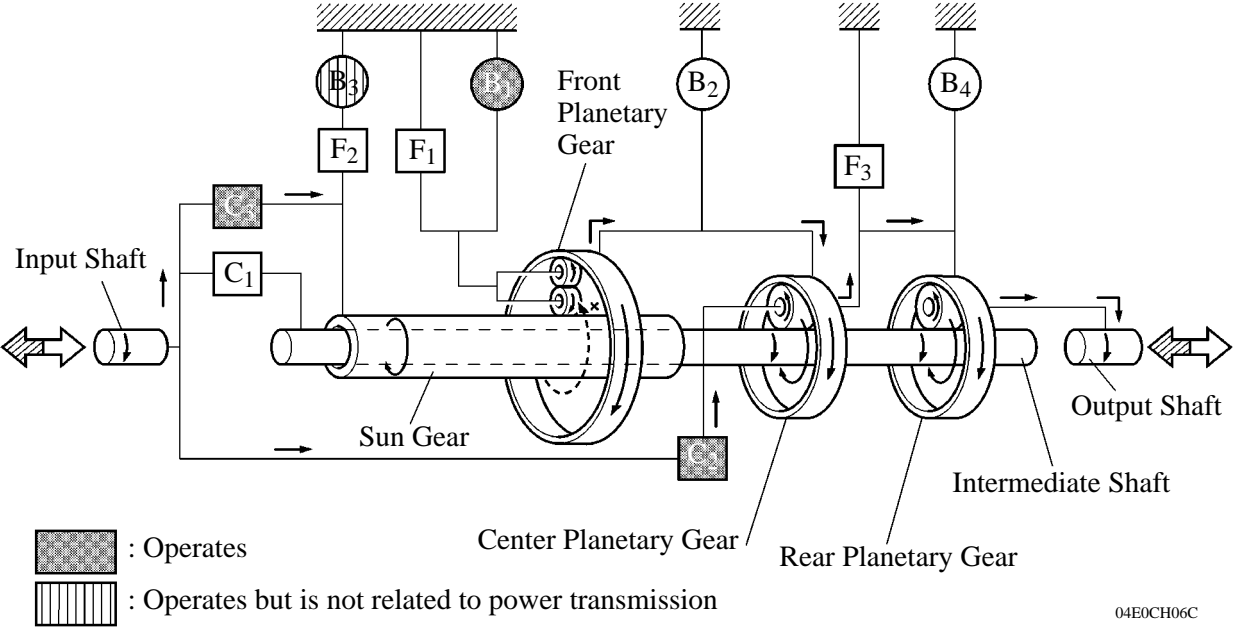


04E0CH05C

C1	C2	C3	B1	B2	B3	B4	F1	F2	F3
○	○	●			●				

○: Operates    ●: Operates but is not related to power transmission

5th Gear (D Position or S Mode)

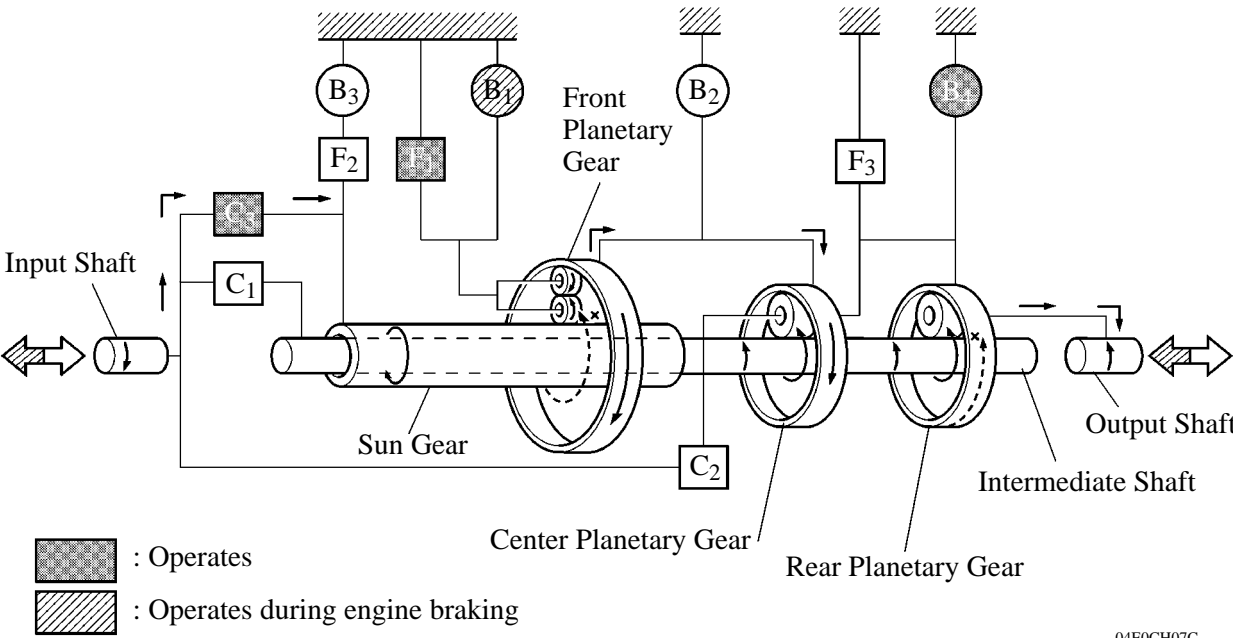


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C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
	○	○	○		●				

○: Operates    ●: Operates but is not related to power transmission

Reverse Gear (R Position)



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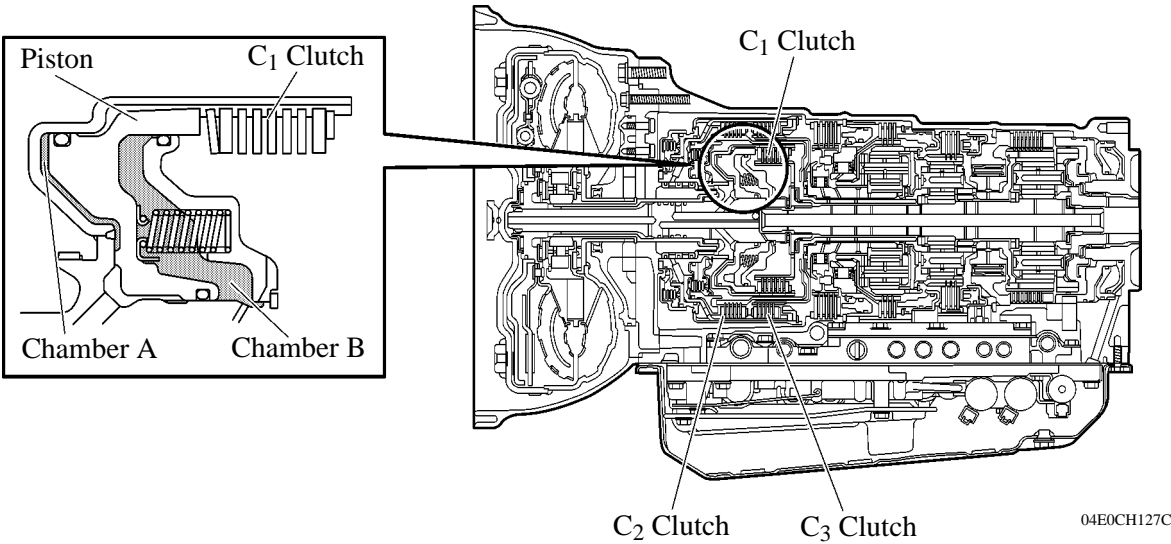
C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
		○	(○)			○	○		

○: Operates    (○): Operates during engine braking

4. Centrifugal Fluid Pressure Canceling Mechanism

For the following reason, the centrifugal fluid pressure canceling mechanism is used on the C<sub>1</sub>, C<sub>2</sub>, and C<sub>3</sub> 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.



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157CH171

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