PLANETARY GEAR [GW6A-EL, GW6AX-EL]

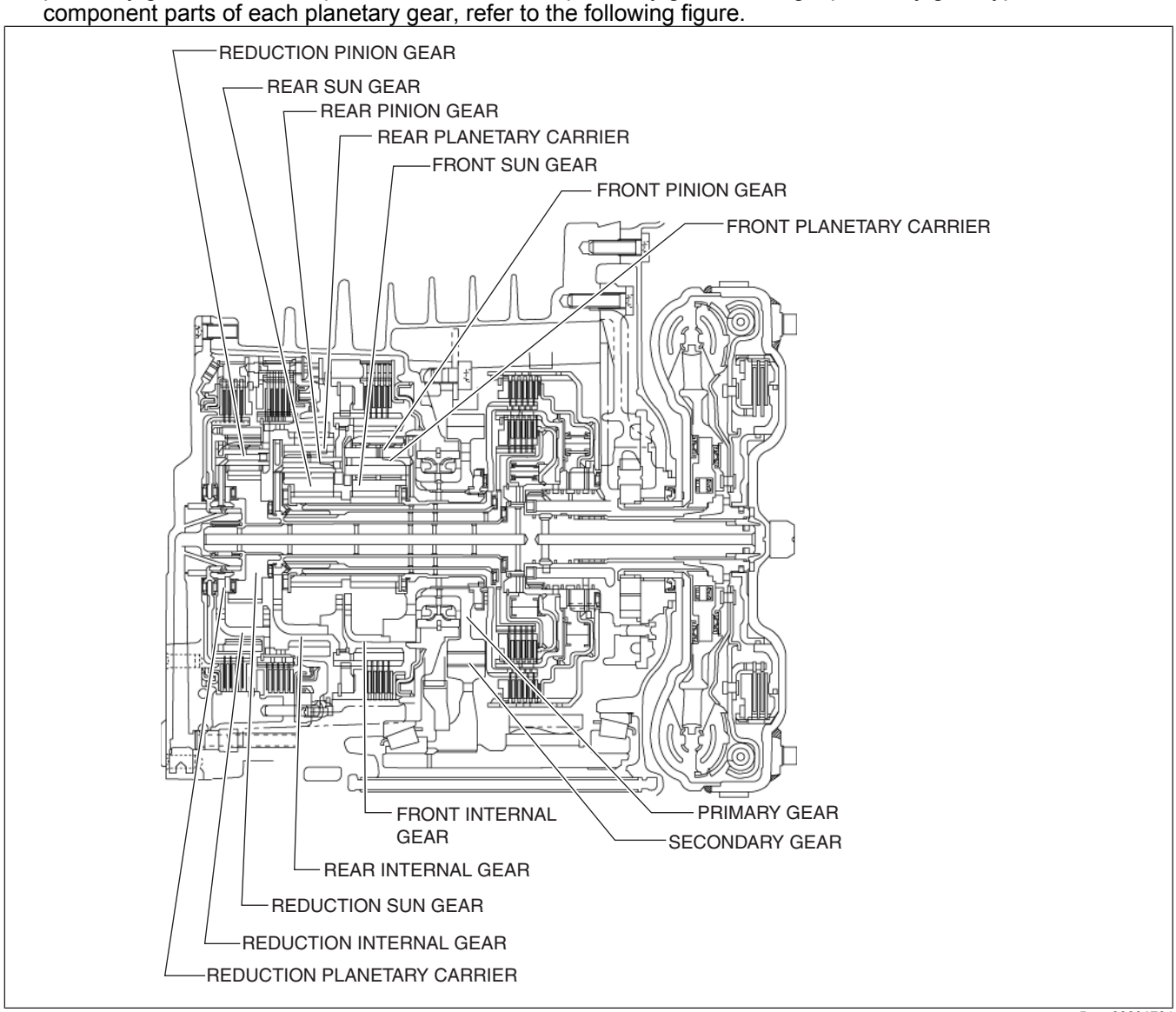
id0517i2351800

Purpose/Function

- The planetary gear is a mechanism which shifts the drive force from the engine. The planetary gear consists of multiple gears which rotate individually while revolving. By controlling the individual rotation and revolving of the gears, the transaxle performs gear shifting at the optimum gear speed according to the driving conditions.

Construction

- The planetary gear is positioned in the order of the front planetary gear, rear planetary gear, and reduction planetary gear from the torque converter side. The planetary gear is a single planetary gear type. For the component parts of each planetary gear, refer to the following figure.



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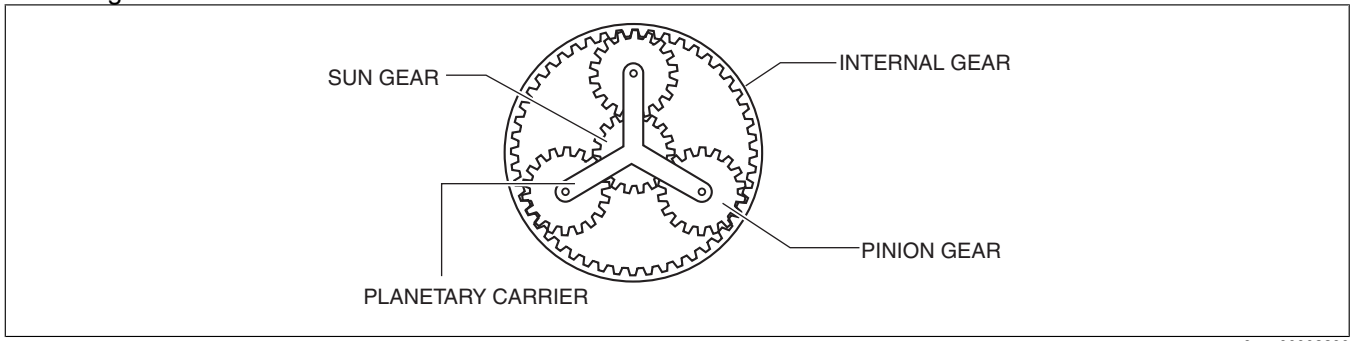
- The planetary gear is composed of the sun gear, pinion gear, planetary carrier, and internal gear as shown in the figure.



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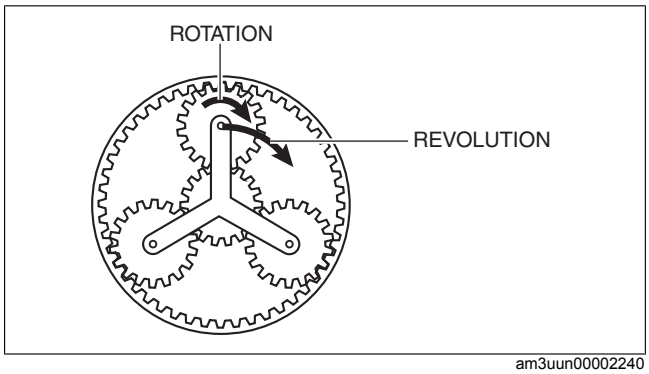
- There are two types of pinion gear rotation, rotation (rotation) on an axis of the center for each pinion gear and rotation (revolution) on an axis of center for the planetary carrier. The planetary gear operates shifting function by switching the input, fixed, or output of the internal gear, pinion gear, and planetary carrier.
- The relation of rotation speed of each element for the planetary gear set is generally indicated as follows:
  $(Z_R + Z_S)\ N_C = Z_R\ N_R + Z_S\ N_S$: (1)
  Meaning of symbols
  — Z: Number of teeth
  — N: Rotation speed
  — Additional character R: Internal gear
  — Additional character S: Sun gear
  — Additional character C: Planetary carrier (pinion gear)



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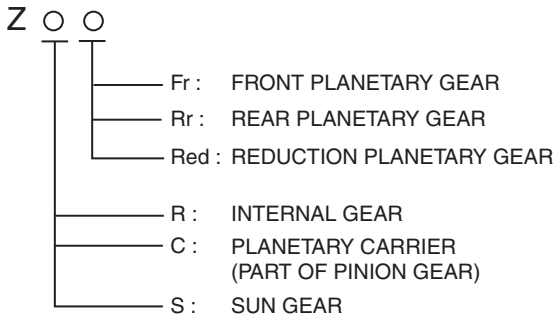
Number of teeth and symbols for each gear

Planetary gear unit		Number of teeth	Symbols
Front	Internal gear	97	Z_{RFr}
	Planetary carrier (part of pinion gear)	29	Z_{CFr}
	Sun gear	39	Z_{SFr}
Rear	Internal gear	95	Z_{RRr}
	Planetary carrier (part of pinion gear)	27	Z_{CRr}
	Sun gear	41	Z_{SRr}
Reduction	Internal gear	109	Z_{RRed}
	Planetary carrier (part of pinion gear)	22	Z_{CRed}
	Sun gear	66	Z_{SRed}

Meaning of symbols



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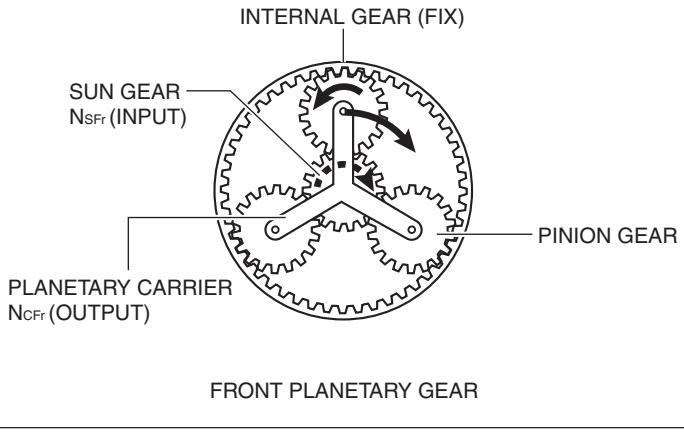
Operation
1GR



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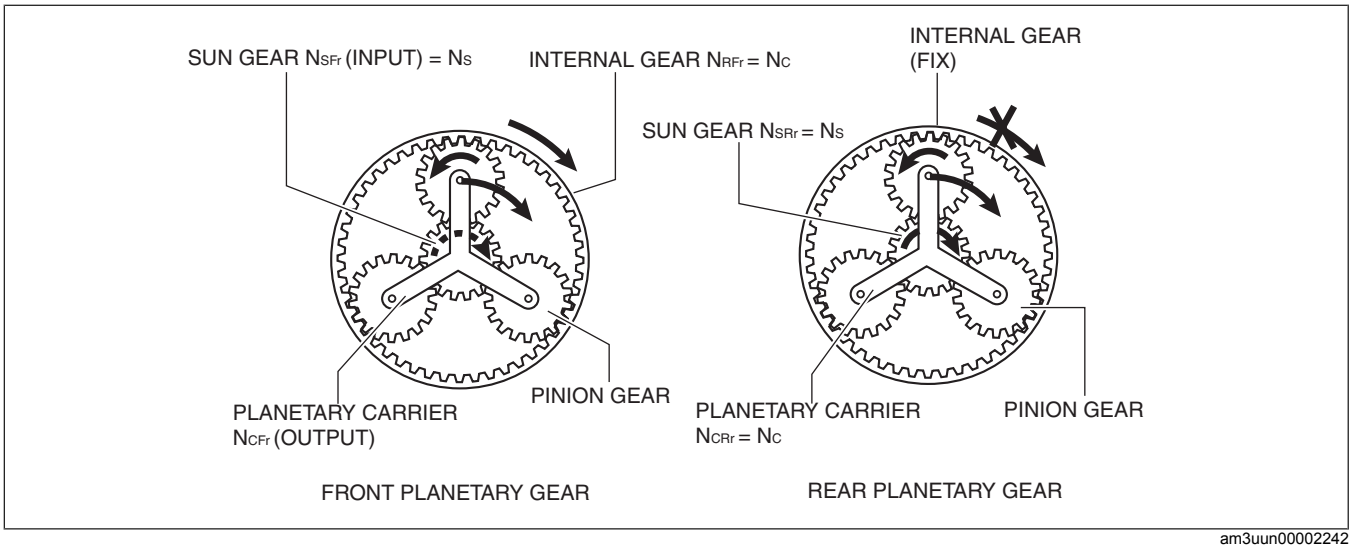
Rotation speed for each gear

Planetary gear unit	Front planetary gear
Internal gear	0 (Fix)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)
Sun gear	N_{SFr} (Input)

2GR



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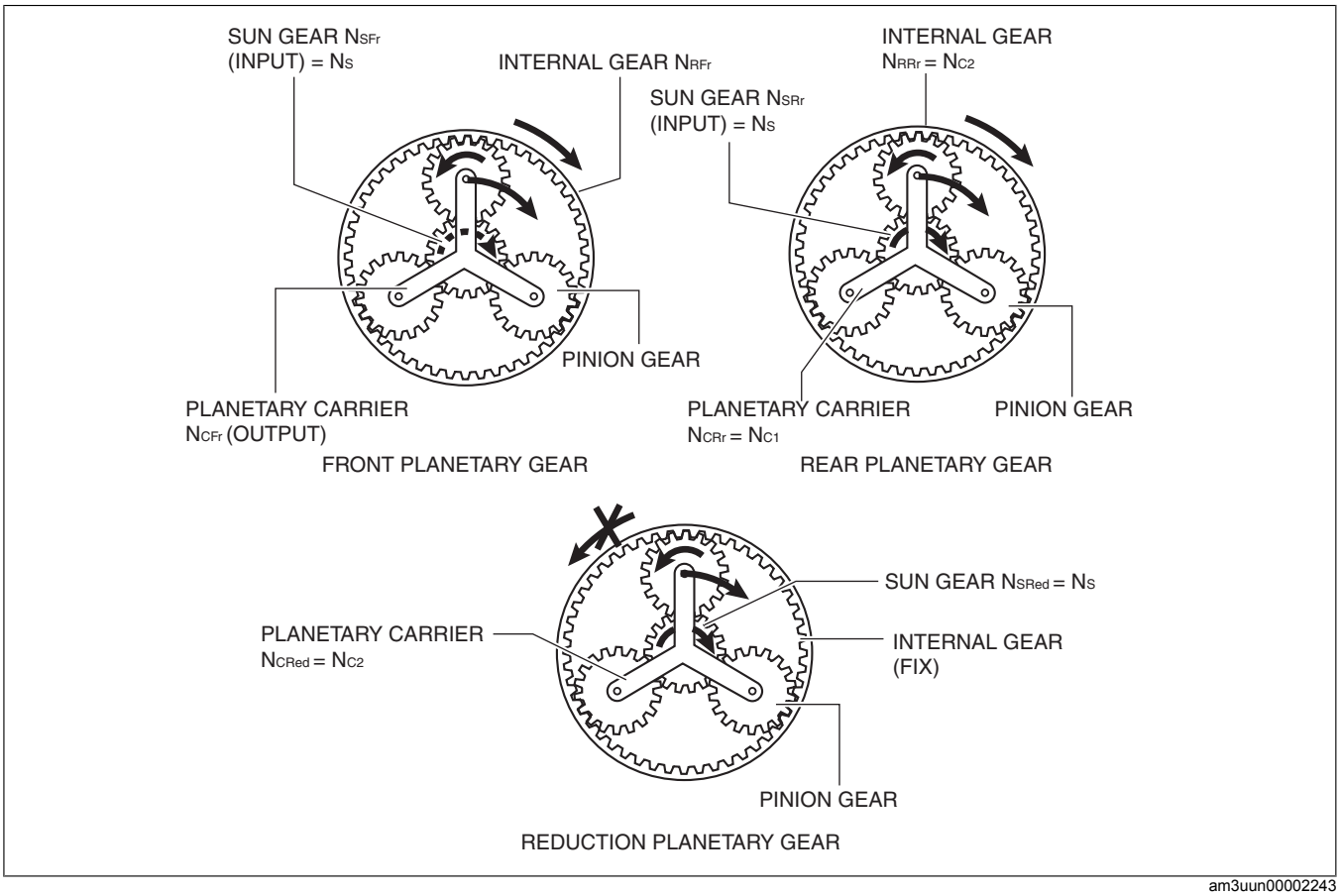
Rotation speed for each gear

Planetary gear unit	Front planetary gear	Rear planetary gear
Internal gear	$N_{RFr}=N_C$	0 (Fix)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)	$N_{CRr}=N_c$
Sun gear	N_{SFr} (Input)=N_S	$N_{SRr}=N_S$

3GR



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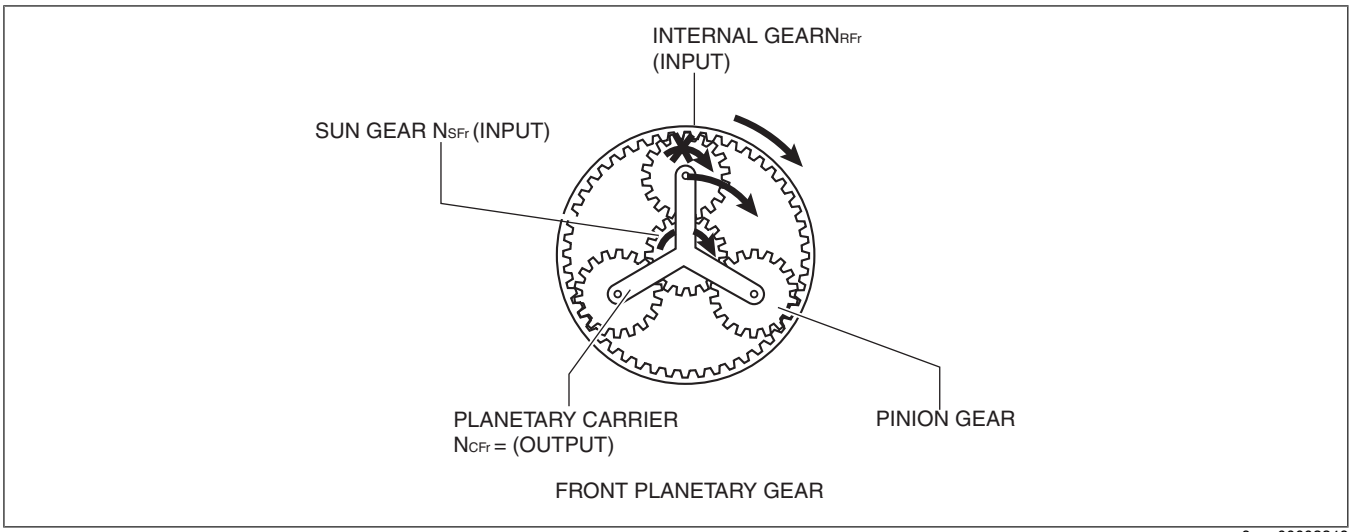
Rotation speed for each gear

Planetary gear unit	Front planetary gear	Rear planetary gear	Reduction
Internal gear	$N_{RFr}=N_{C1}$	$N_{RRr}=N_{c2}$	0 (Fix)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)	$N_{CRr}=N_{c1}$	$N_{CRed}=N_{c2}$
Sun gear	N_{SFr} (Input)=N_S	$N_{SRr}=N_S$	$N_{SRed}=N_S$

4GR



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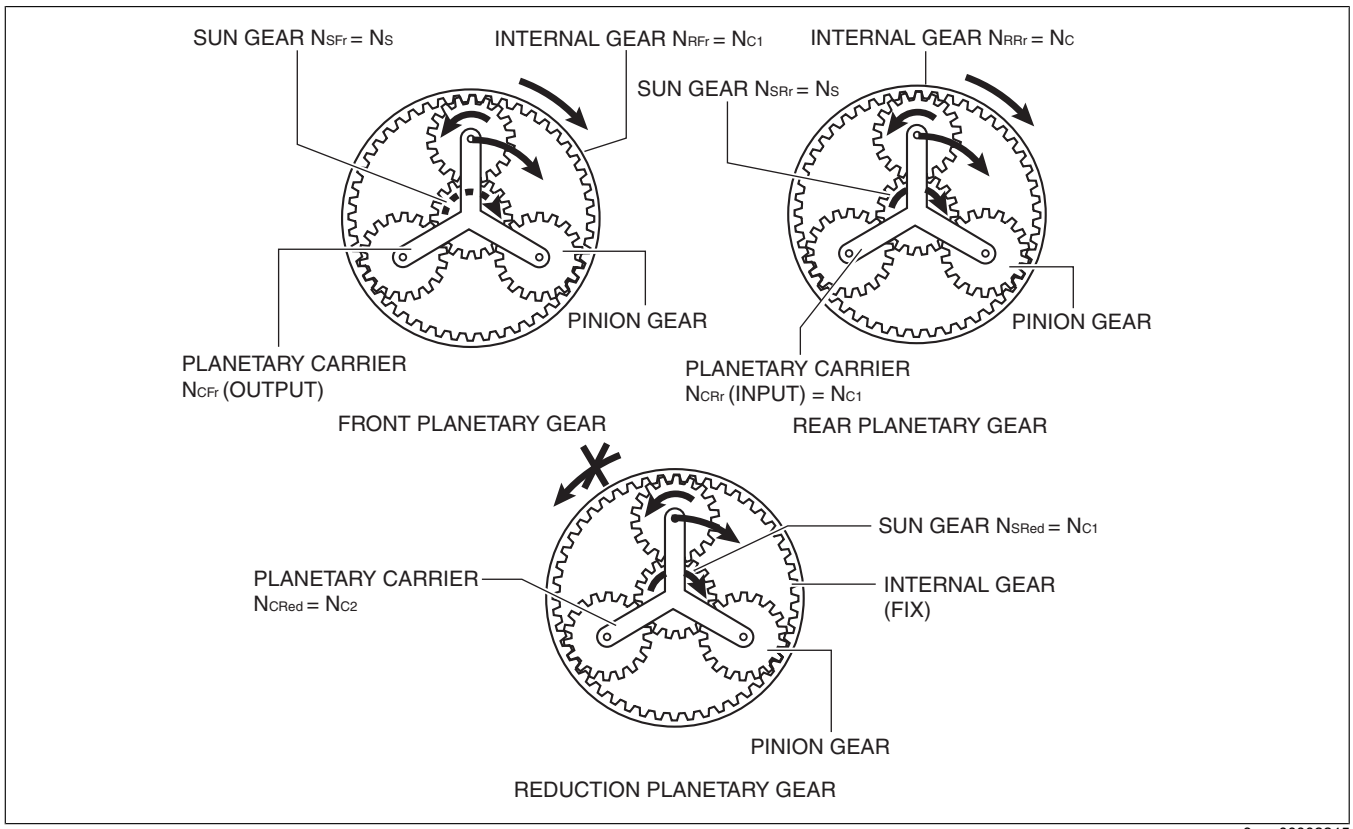
Rotation speed for each gear

Planetary gear unit	Front planetary gear
Internal gear	N_{RFr} (Input)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)

Planetary gear unit	Front planetary gear
Sun gear	N_{SFr} (Input)

5GR



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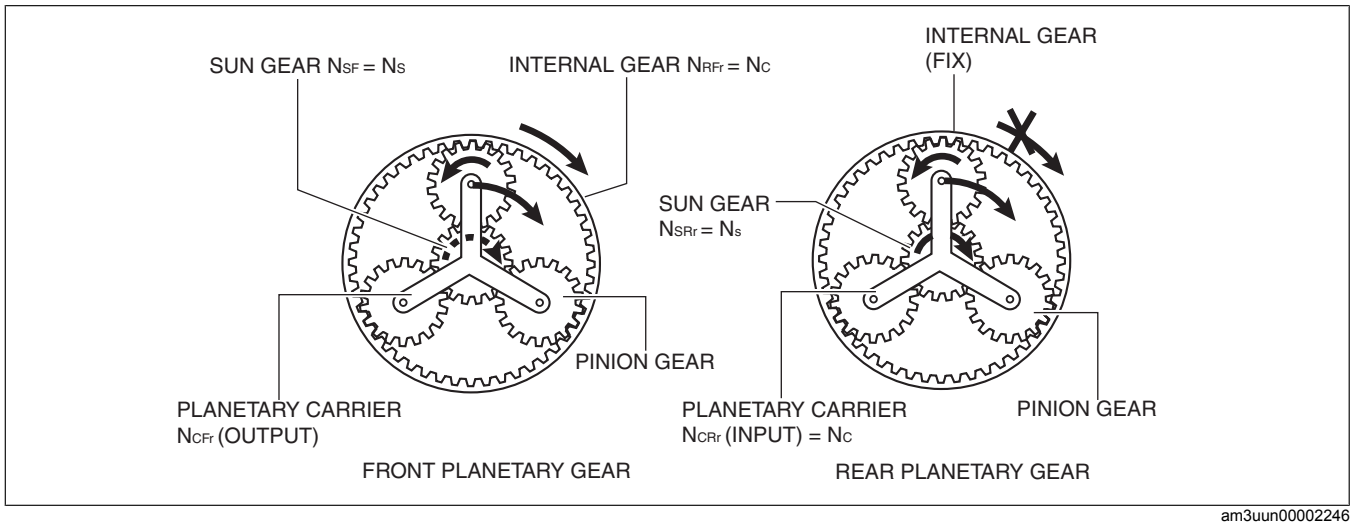
Rotation speed for each gear

Planetary gear unit	Front planetary gear	Rear planetary gear	Reduction
Internal gear	$N_{RFr}=N_{C1}$	$N_{RRr}=N_{c2}$	0 (Fix)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)	N_{CRr} (Input)$=N_{c1}$	$N_{CRed}=N_{c2}$
Sun gear	$N_{SFr}=N_S$	$N_{SRr}=N_S$	$N_{SRed}=N_{c1}$

6GR



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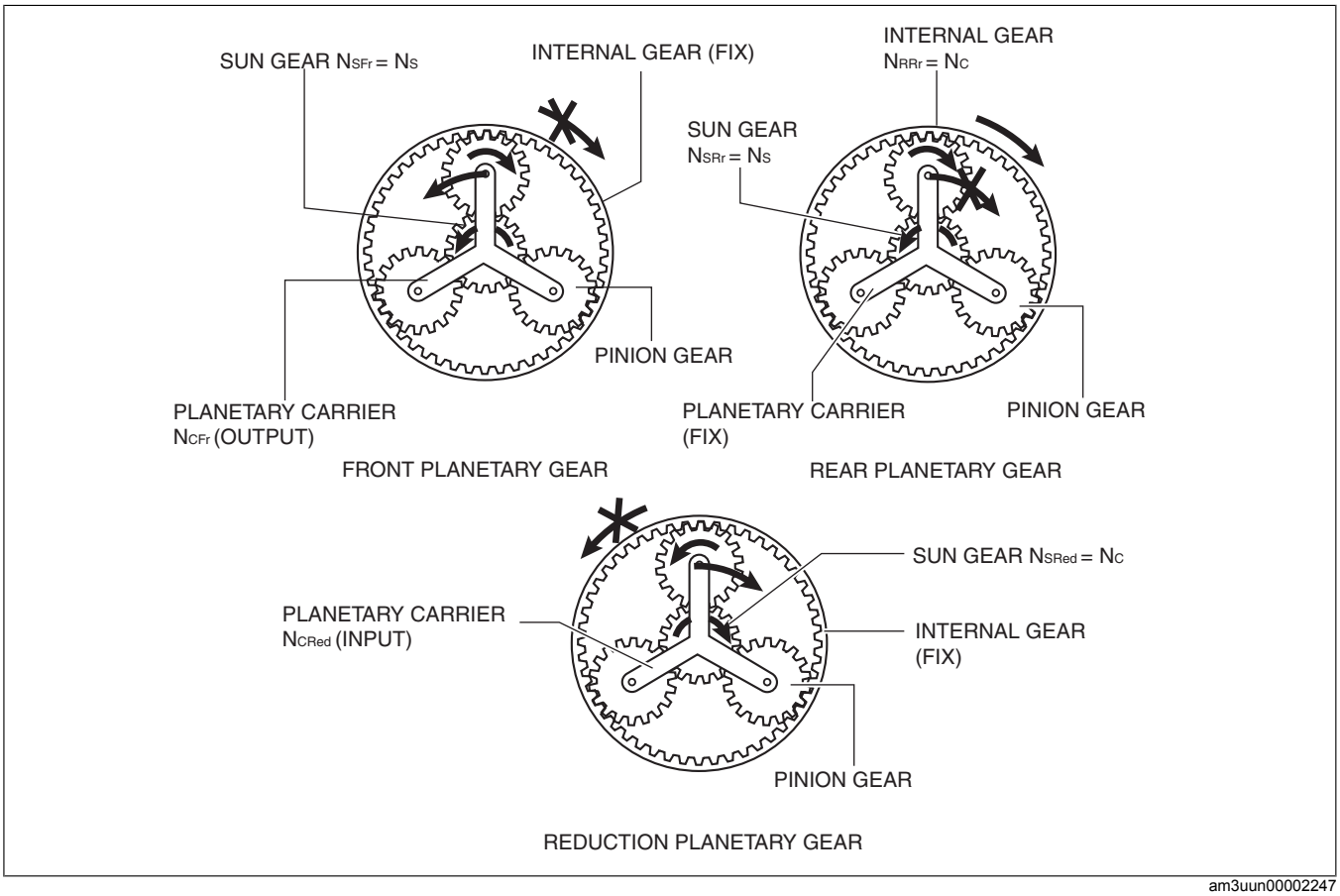
Rotation speed for each gear

Planetary gear unit	Front planetary gear	Rear planetary gear
Internal gear	$N_{RFr}=N_C$	0 (Fix)

Planetary gear unit	Front planetary gear	Rear planetary gear
Planetary carrier (part of pinion gear)	N_{CFr} (Output)	N_{CRr} (Input)=N_C
Sun gear	N_{SFr}=N_S	N_{SRr}=N_S

Reverse



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Rotation speed for each gear

Planetary gear unit	Front planetary gear	Rear planetary gear	Reduction
Internal gear	N_{RFr} (Fix)	N_{RRr}=N_C	0 (Fix)
Planetary carrier (part of pinion gear)	N_{CFr} (Output)	N_{CRr} (Fix)	N_{CRed}=N_C
Sun gear	N_{SFr}=N_S	N_{SRr}=N_S	N_{SRed} (Input)