

KES

The Planetary Gear Set of Automatic Transmission

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Contents

1. Scope of Application
2. Purpose
3. Definition of Terminology
4. Explanation of Sign
5. Design Data
6. Design Procedure

1. Scope of Application

This standard shall regulate the planetary gear set of automatic transmission.

2. Purpose

The purpose shall be the standardization of considering items and design methods in planetary gear design.

3. Definition of Terminology

(1) Sun gear

Located in the center of planetary gear set

(2) Ring gear

Also called internal gear, and located in the most outer of planetary gear set

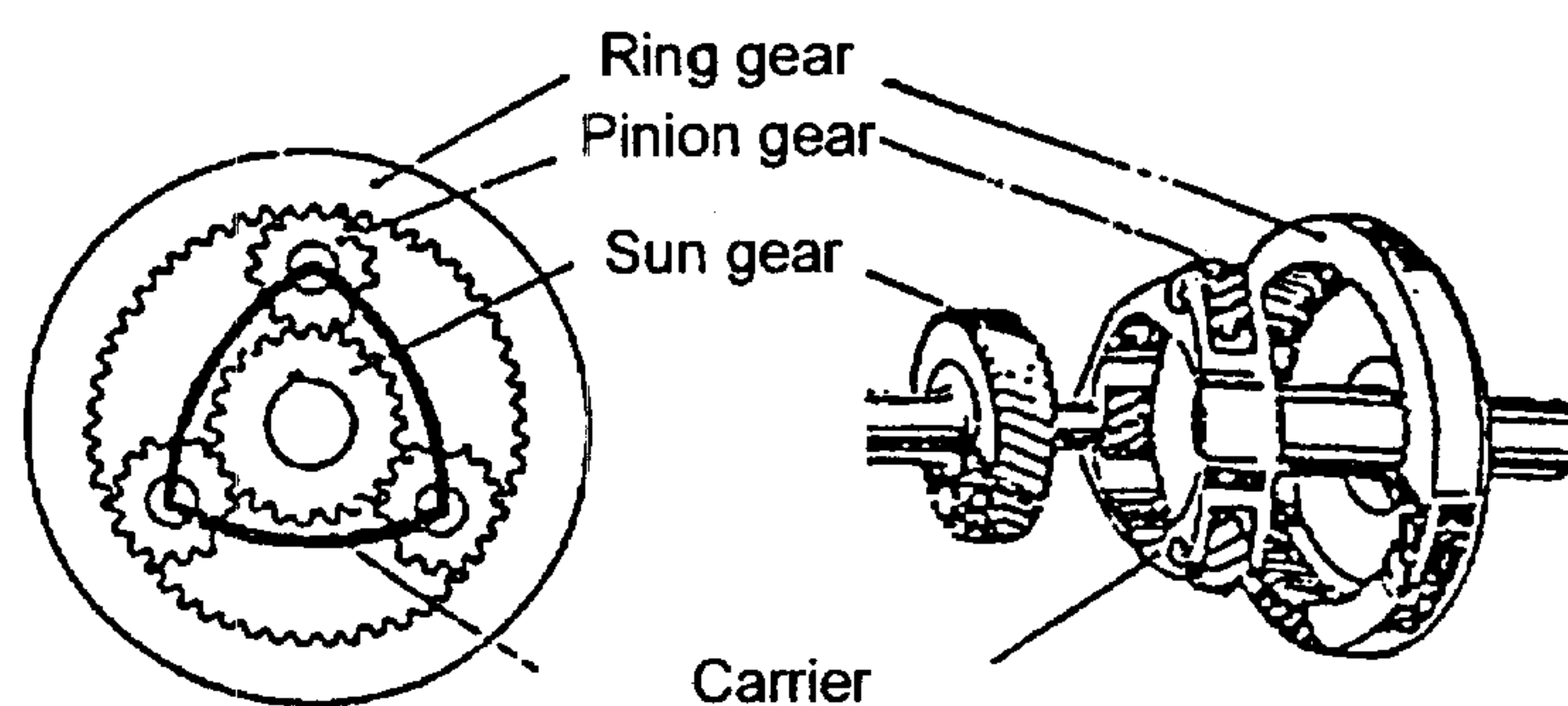
(3) Pinion gear

Located between sun gear and ring gear

(4) Carrier

Body supporting pinion gear

• Structure



• Composing parts : Sun gear

Pinion gear

Carrier

Ring gear

* Pinion can rotate and revolve when sun gear rotates.

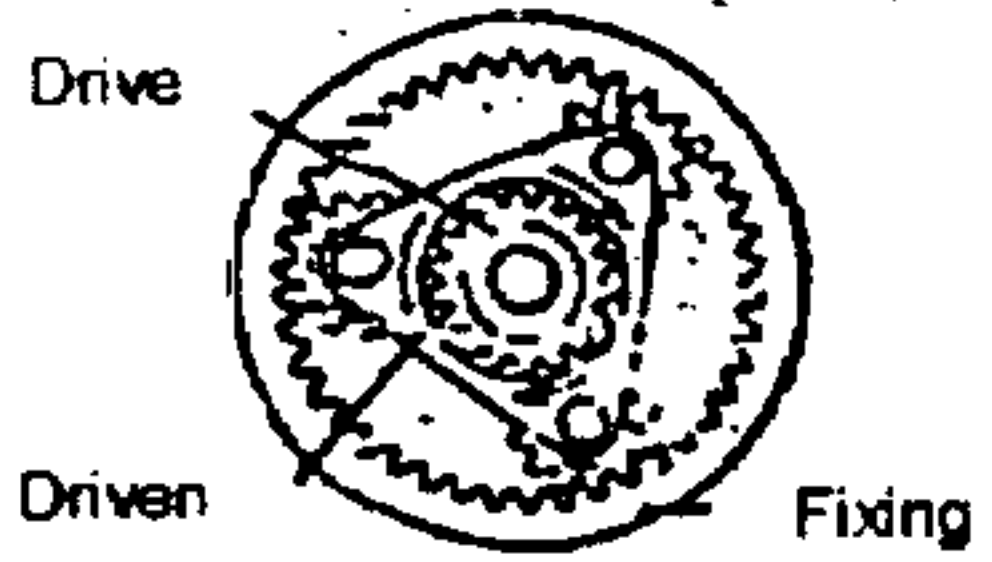
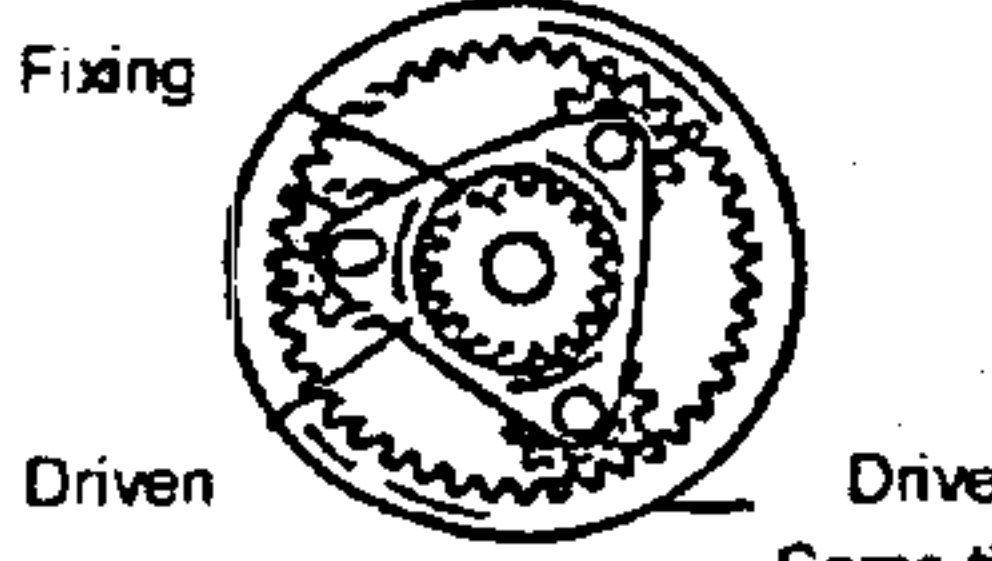
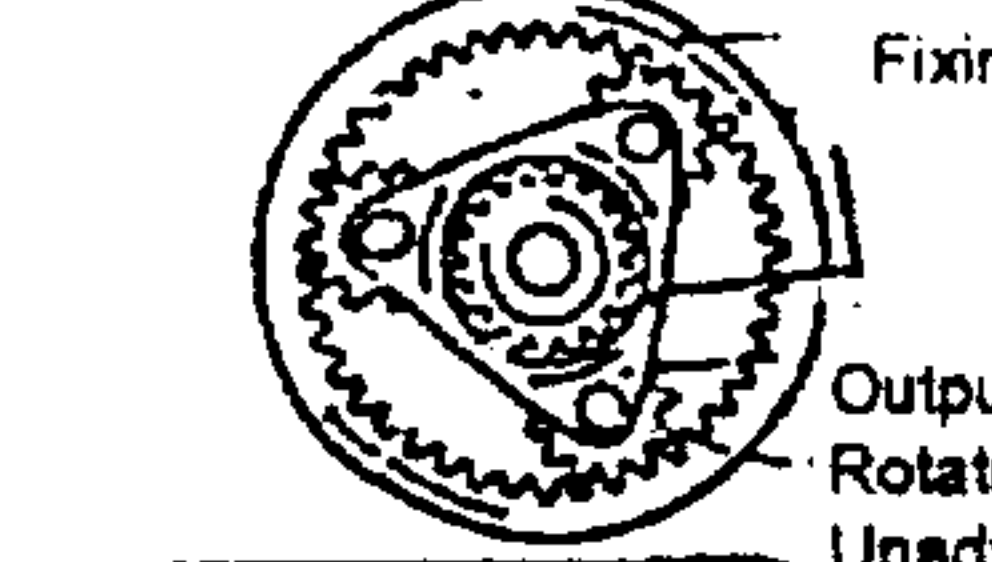
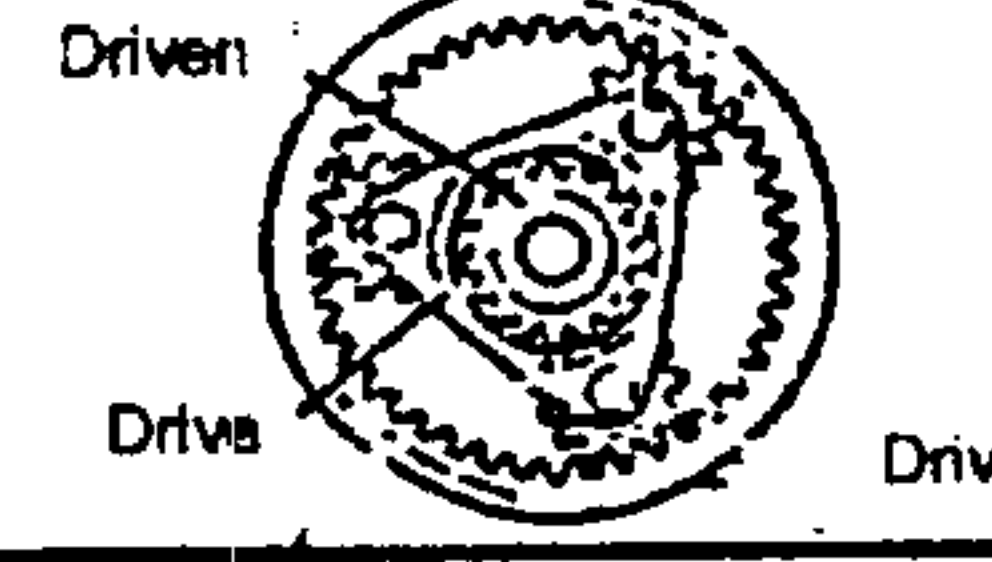
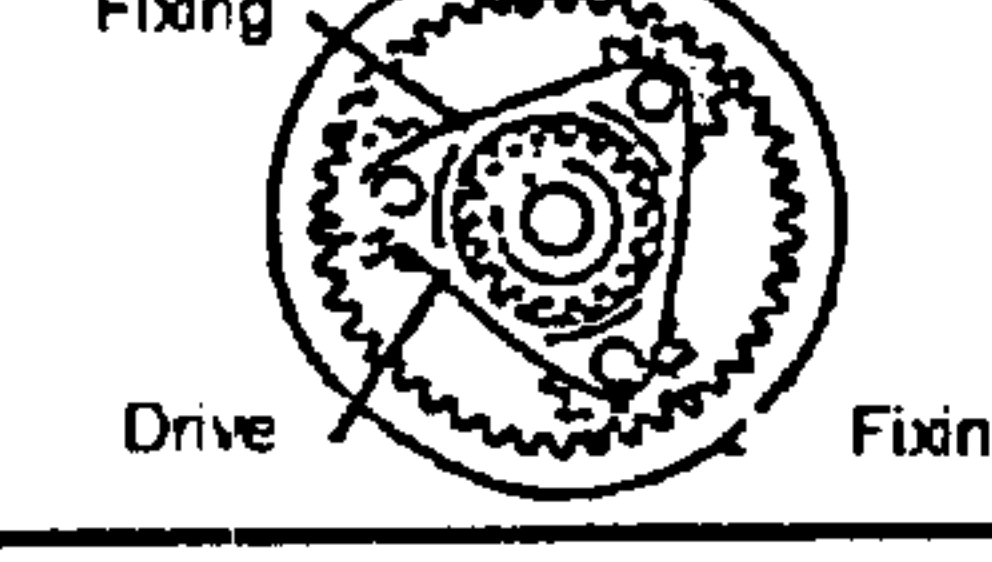
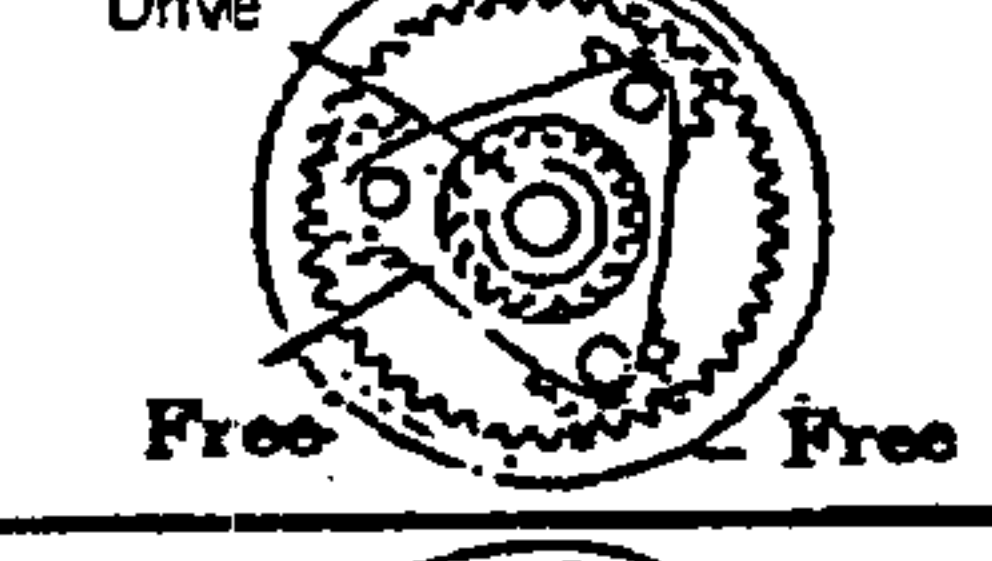
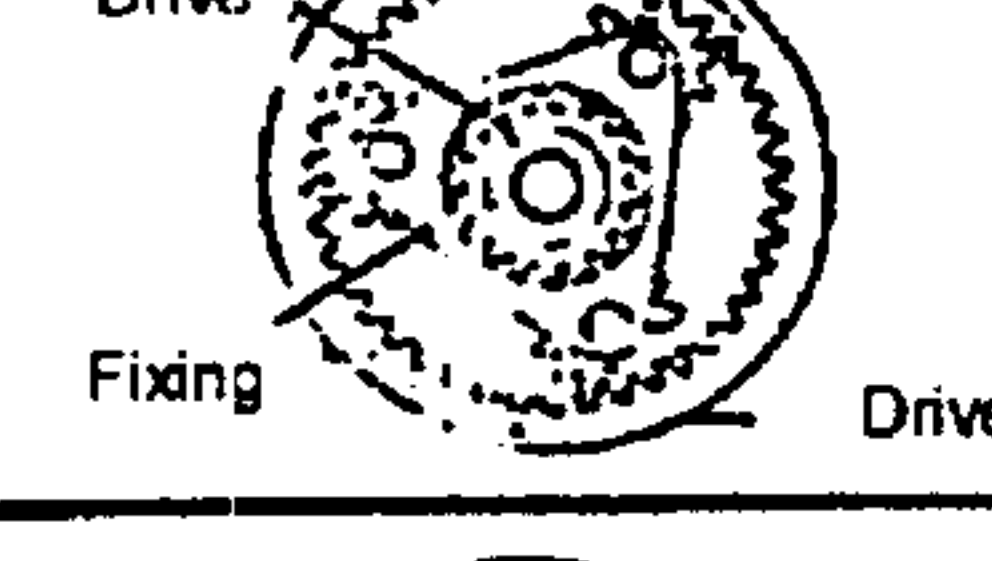
• Principle

- Increase or decrease the velocity by fixing one of three, sun gear, carrier, ring gear, and drive or driven and the others.
- It becomes direct connection when 2 is combined
- Idle occurs without fixing parts

- Multi-plate clutch, multi-plate break, band break and one-way clutch is used for combining and fixing
- Type
 - Simpson type
Two planetary gear sets connected by one sun gear
 - Revinier type
Composed by two sun gear and two pinion sets connected by that
 - Etc. (Gear train specially combined by each manufacture)

•Gear ratio

S : Sun gear
P/G : Pinion gear
R : Ring gear

Rotation Condition	Condition			Ratio of velocity change		Comparison
	Drive	Driven	Fixing	$i = \frac{n_1}{n_2}$	Scope	
	S	P/C	R	$\frac{Z_1 + Z_3}{Z_1}$	$i > 2$	
	R	P/C	S	$\frac{Z_1 + Z_3}{Z_3}$	$1 < i < 2$	
	-	-	R&P/C (P/C&S) (S&R)	1	$i = 1$	
	P/C	R	S	$\frac{Z_3}{Z_1 + Z_3}$	$0.5 < i < 1$	
	P/C	S	R	$\frac{Z_1}{Z_1 + Z_3}$	$0 < i < 0.5$	
	S	-	-	-	N	
	S	R	P/C	$-\frac{Z_3}{Z_1}$	$-\infty < i < -1$	
	R	S	P/C	$-\frac{Z_1}{Z_3}$	$-1 < i < 0$	