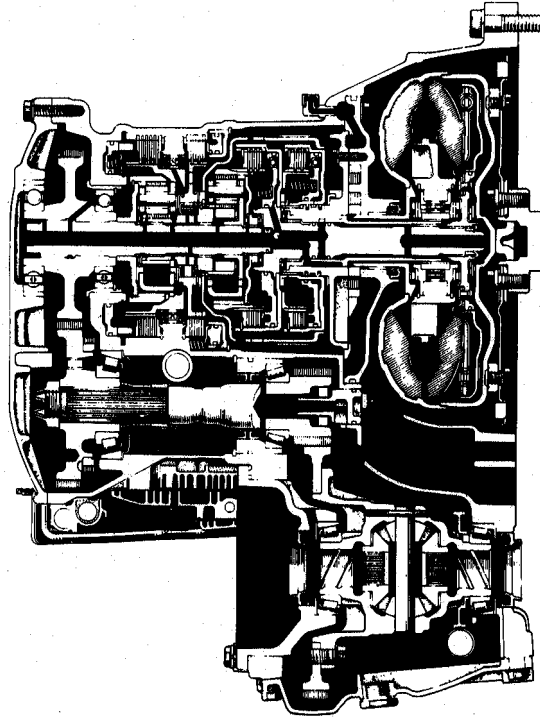


Section 1

FUNDAMENTALS OF AUTOMATIC TRANSMISSIONS



Lesson Objectives

1. Compare the function of automatic transmission systems of front- and rear-wheel drive transmissions.
2. List the three major component systems used in Toyota automatic transmissions which:
 - a. Transfer torque from the engine.
 - b. Provide varying gear ratios.
 - c. Regulate shift quality and timing.
3. Identify the three types of holding devices used in Toyota automatic transmissions.

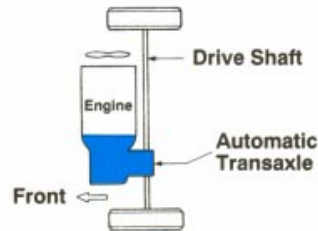
Types of Automatic Transmissions

Automatic transmissions can be basically divided into two types: those used in front-engine, front-wheel drive (FF) vehicles and those used in front-engine, rear-wheel drive (FR) vehicles.

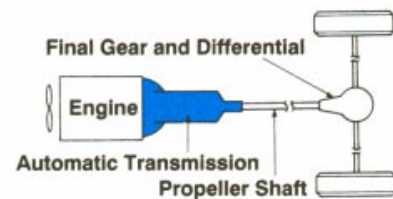
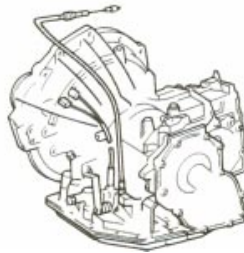
Transmissions used in front-wheel drive vehicles are designed to be more compact than transmissions used in rear-wheel drive vehicles because they are mounted in the engine compartment. They are commonly referred to as a "transaxle."

Automatic Transmission Types

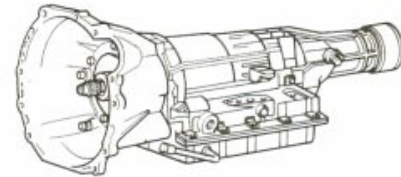
The basic function and purpose for either front or rear drive automatic transmissions are the same.



Front-Wheel Drive



Rear-Wheel Drive



The differential is an integral part of the front-wheel drive transmission, whereas the differential for the rear-wheel drive transmission is mounted externally. The external differential is connected to the transmission by a driveshaft.

The basic function and purpose for either front or rear drive automatics are the same. They share the same planetary gear train design which is used in all Toyota automatic transmissions and the majority of automatics in production today.

The automatic transmission is composed of three major components:

- Torque converter
- Planetary gear unit
- Hydraulic control unit

For a full understanding of the operation of the automatic transmission, it is important to understand the basic role of these components.

The torque converter provides a means of power transfer from the engine to the input shaft of the transmission. It acts like an automatic clutch to engage engine torque to the transmission and also allows the engine to idle while the vehicle is standing still with the transmission in gear.

The planetary gear unit provides multiple gear ratios in the forward direction and one in reverse. The design includes two simple planetary gear sets and a common sun gear. These ratios are provided by use of holding devices which hold members of the planetary set. These holding devices can be multiplate clutches or brakes, brake bands or one-way clutches.

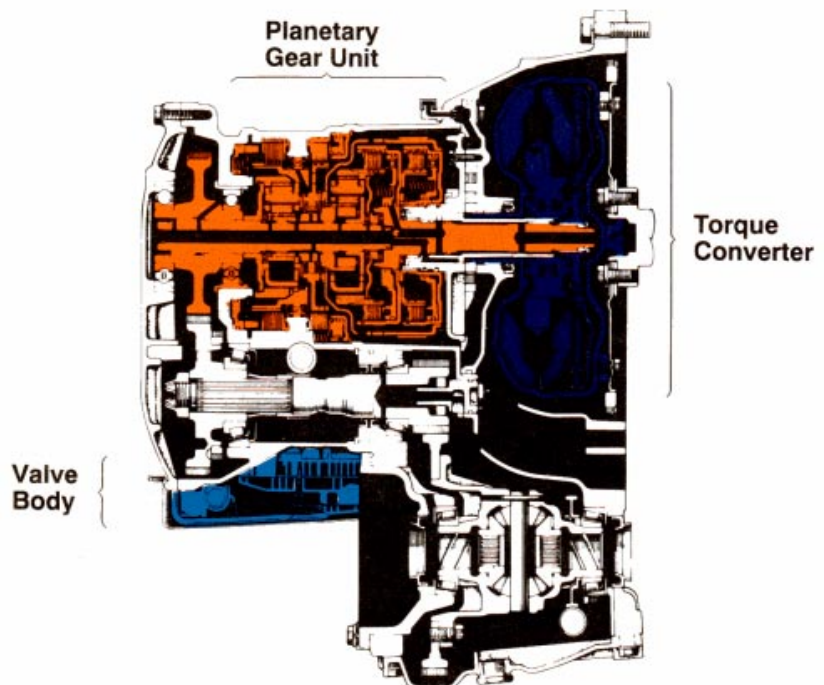
The hydraulic control unit regulates hydraulic pressure and shift points based on vehicle speed and throttle position. It is made up of a highly precision housing and spool valves which are balanced between spring tension and hydraulic pressure. The spool valves in turn control hydraulic passages to holding devices and regulate pressure.

Major Transmission Components

Torque Converter
- Transfers engine torque..

Planetary Gear
- Multiple gear ratios.

Valve Body
- Hydraulic control unit





WORKSHEET 1
Disassembly

Transmission

Transmission Symptoms:

1. Measure input shaft end play: _____
2. Remove transmission pan and valve body.
3. Measure piston stroke of second coast brake: _____
4. Air test the following: Air test pressure: _____ psi OK NG

OD Brake (B0)	<input type="checkbox"/>	<input type="checkbox"/>
2nd Coast Brake (B1)	<input type="checkbox"/>	<input type="checkbox"/>
2nd Brake (B2)	<input type="checkbox"/>	<input type="checkbox"/>
1st and Reverse Brake (B3)	<input type="checkbox"/>	<input type="checkbox"/>
Underdrive Brake (B4)*	<input type="checkbox"/>	<input type="checkbox"/>
OD Direct Clutch (C0)	<input type="checkbox"/>	<input type="checkbox"/>
Forward Clutch (C1)	<input type="checkbox"/>	<input type="checkbox"/>
Direct and Reverse Clutch (C2)	<input type="checkbox"/>	<input type="checkbox"/>
Underdrive Direct Clutch (C3)*	<input type="checkbox"/>	<input type="checkbox"/>

STOP! Do not proceed. Obtain instructor sign-off.

5. Check "one-way" clutches as they are removed:
Indicate locking direction.

FO	_____	<input type="checkbox"/>	<input type="checkbox"/>
F1	_____	<input type="checkbox"/>	<input type="checkbox"/>
F2	_____	<input type="checkbox"/>	<input type="checkbox"/>
F3*	_____	<input type="checkbox"/>	<input type="checkbox"/>

6. Measure pinion gear thrust clearance on front and rear planetaries.
 Front Measurement: _____ Rear Measurement: _____
 Specification: _____ Specification: _____

7. Measure total preload of counter shaft and differential. Ft.-Lbs.

Do not remove counter shaft or differential until prompted by your instructor.

Instructor sign-off:

*A240 Series only



Notes

A large grid area for taking notes, consisting of a fine grid of squares.