



The automatic transmission is a combination of a 3-element torque converter and triple-shaft automatic transmission which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

## **Torque Converter, Gears and Clutches**

The torque converter consists of a pump, turbine and stator assembly in a single unit. The torque converter is connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has three parallel shafts, the mainshaft, countershaft and sub-shaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the 1st, and 2nd/4th clutches, and gears for 3rd, 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with the 4th gear).

The countershaft includes the 3rd clutch and gears for 3rd, 2nd, 4th, reverse, 1st and parking. Reverse and 4th gears can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector is moved. The sub-shaft includes the 1st-hold clutch and gears for 1st and 4th.

The gears on the mainshaft are in constant mesh with those on the countershaft and sub-shaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide **D<sub>4</sub>**, **D<sub>3</sub>**, **2**, **1** and **R**.

## **Hydraulic Control**

The valve body assembly includes the main valve body, secondary valve body, regulator valve body, servo body, modulator valve body, lock-up valve body, and governor body, through the respective separator plates.

They are bolted on the torque converter housing.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 3-2 timing valve, 4th exhaust valve, relief valve, and oil pump gears.

The secondary valve body contains the 4-3 kick-down valve, 2nd ON orifice control valve, 2-3 orifice control valve, 2-1 timing valve, Clutch Pressure Control (CPC) valve, servo control valve, reverse control valve, and governor cut valve.

The regulator valve body contains the pressure regulator valve, lock-up control valve, torque converter check valve, and cooler check valve.

The servo body contains the servo valve which is integrated with the shift fork shaft, throttle valves A and B, 2/3-4 orifice control valve, and accumulators.

The modulator valve body, which is bolted on the servo body, contains the modulator valve.

The lock-up valve body contains the lock-up shift valve and lock-up timing B valve, and is bolted on the regulator valve body.

The governor body is bolted on the torque converter housing near the differential.

Fluid from the regulator passes through the manual valve to the various control valves.

## **Lock-up Mechanism**

In **D<sub>4</sub>** position, 2nd, 3rd and 4th, and **D<sub>3</sub>** position in 3rd, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the engine control module (ECM) optimizes the timing of the lock-up mechanism.

The lock-up shift valve controls the range of lock-up according to the lock-up control solenoid valves A and B, and throttle valve B. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the ECM.

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# Description

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## Gear Selection

The shift lever has seven positions; **P** PARK, **R** REVERSE, **N** NEUTRAL, **D<sub>4</sub>** 1st through 4th positions, **D<sub>3</sub>** 1st through 3rd positions, **2** 2nd gear and **1** 1st gear.

Position	Description
<b>P</b> PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
<b>R</b> REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.
<b>N</b> NEUTRAL	All clutches released.
<b>D<sub>4</sub></b> DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in 2nd, 3rd and 4th with the transmission in <b>D<sub>4</sub></b> or <b>D<sub>3</sub></b> position.
<b>D<sub>3</sub></b> DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd then 3rd, depending on vehicle speed and throttle position. Downshifts through lower gears on deceleration to stop.
<b>2</b> SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking or better traction starting off on loose or slippery surface.
<b>1</b> FIRST	Driving in 1st gear; stays in 1st gear, does not shift up. For engine braking.

Starting is possible only in **P** and **N** positions through use of a slide-type, neutral-safety switch.

## Automatic Transaxle (A/T) Gear Position Indicator

A/T Gear position indicator in the instrument panel shows what gear has been selected without having to look down at the console.

