



# Description

The automatic transmission is a combination of a 3-element torque converter and a dual-shaft electronically controlled 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, assembled in a single unit.

They are connected to the engine crankshaft so they turn together as a unit as the engine turns.

Around the outside of the drive plate 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 two parallel shafts, the mainshaft and the countershaft. The mainshaft is in line with the engine crankshaft.

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

The countershaft includes the clutches for 3rd, 1 st-hold and reverse, and gears for 3rd, 4th, 1 st, 2nd, reverse and parking. The secondary drive gear is integrated with the countershaft.

The gears on the mainshaft are in constant mesh with those on the countershaft.

When certain combinations of gears in the transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide **1**, **2**, **D<sub>3</sub>**, **D<sub>4</sub>** and **R** positions.

## Electronic Control

The electronic control system consists of a Powertrain Control Module (PCM), sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

The PCM is located below the dashboard, under the front lower panel on the passenger's side.

## Hydraulic Control

The lower valve body assembly includes the main valve body, secondary valve body, throttle valve body, linear solenoid, shift control solenoid valves and the oil pass body. They are bolted on the lower part of the transmission housing. Other valve bodies, the regulator valve body, oil pump body and the accumulator body, are bolted to the torque converter housing.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 4-3 kick-down valve and Clutch Pressure Control (CPC) valve.

The secondary valve body contains the 3-4 orifice control valve, 4-3 shift timing valve, modulator valve and accumulator pistons.

The throttle valve body includes the throttle valve which is bolted onto the secondary valve body.

The linear solenoid is joined to the throttle valve body.

The regulator valve body contains the regulator valve, lock-up shift valve and cooler relief valve.

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

The oil pump body contains the lock-up timing valve, lock-up control valve and relief valve. The torque converter check valve is located in the torque converter housing under the oil pump body.

The accumulator body contains the accumulator pistons. The reverse accumulator and 1 st-hold accumulator pistons are assembled in the rear cover.

The 1st, 1 st-hold and reverse clutches receive oil from their respective feed pipes.

## Shift Control Mechanism

Input from various sensors located throughout the car determines which shift control solenoid valve the PCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

## Lock-up Mechanism

In **D<sub>4</sub>** position, in 2nd, 3rd and 4th, 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 PCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve. When lock-up control solenoid valves A and B activate, modulator pressure changes. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the PCM.

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## Gear Selection

The selector lever has seven positions; **P** PARK, **R** REVERSE, **N** NEUTRAL, **D<sub>4</sub>** 1st through 4th gear positions, **D<sub>3</sub>** 1st through 3rd gear 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 clutch engaged.
<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 when the transmission in <b>D<sub>4</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** position through use of a slide-type, neutral-safety switch.

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

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

