



## Description

The automatic transmission is a combination of a 3-element torque converter and a triple-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 in 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 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, the countershaft, and the secondary shaft. The mainshaft is in line with the engine crankshaft.

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

The countershaft includes the clutches for 1st-Hold and 3rd, and gears for 2nd, 3rd, 4th, Reverse and 1st.

The secondary shaft includes the 2nd clutch and gears for 2nd and 3rd.

The 4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.

The gears on the mainshaft and secondary shaft 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**, **3**, and **D**.

### **ELECTRONIC CONTROL**

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

The TCM is located on the insulator center bulkhead, behind the driver's seat.

### **HYDRAULIC CONTROL**

The valve bodies include the main valve body, secondary valve body, servo body, regulator valve body, throttle valve body, lock-up valve body and the 2nd accumulator body.

They are bolted to the torque converter housing as an assembly.

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

The secondary valve body contains the 3-2 kick-down valve, CPC (clutch pressure control) valve, 2nd orifice control valve, 3rd orifice control valve, modulator valve, 4th exhaust valve, servo control valve, 2nd exhaust valve and 4-3 kick-down valve.

The servo body contains the accumulator pistons and servo valve. The throttle valve body includes the throttle valve B which is bolted onto the servo body.

The regulator valve body contains the pressure regulator valve, lock-up control valve and cooler relief valve. Fluid from the regulator passes through the manual valve to the various control valves.

The lock-up valve body contains the lock-up timing B valve and lock-up shift valve. The 2nd accumulator body contains the accumulator pistons and limited slip differential (LSD) relief valve.

The torque converter check valve is located in the torque converter housing, under the main valve body.

The 1st, 1st-hold, 3rd and 4th 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 TCM 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 **3** position and **D** 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 TCM 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 B. 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 TCM.

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## GEAR SELECTION

The selector lever has seven positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D** 1st through 4th gear positions, **3** 3rd gear, **2** 2nd gear and **1** 1st gear.

Position	Description
<b>P</b> PARK	Rear 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</b> DRIVE	General driving; starts in low speed, shifts automatically, 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.
<b>3</b> THIRD	Driving in 3rd gear; stays in 3rd gear, does not shift up and down. For climbing or downhill and light engine braking on high speed condition. The lock-up mechanism comes into operation.
<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.

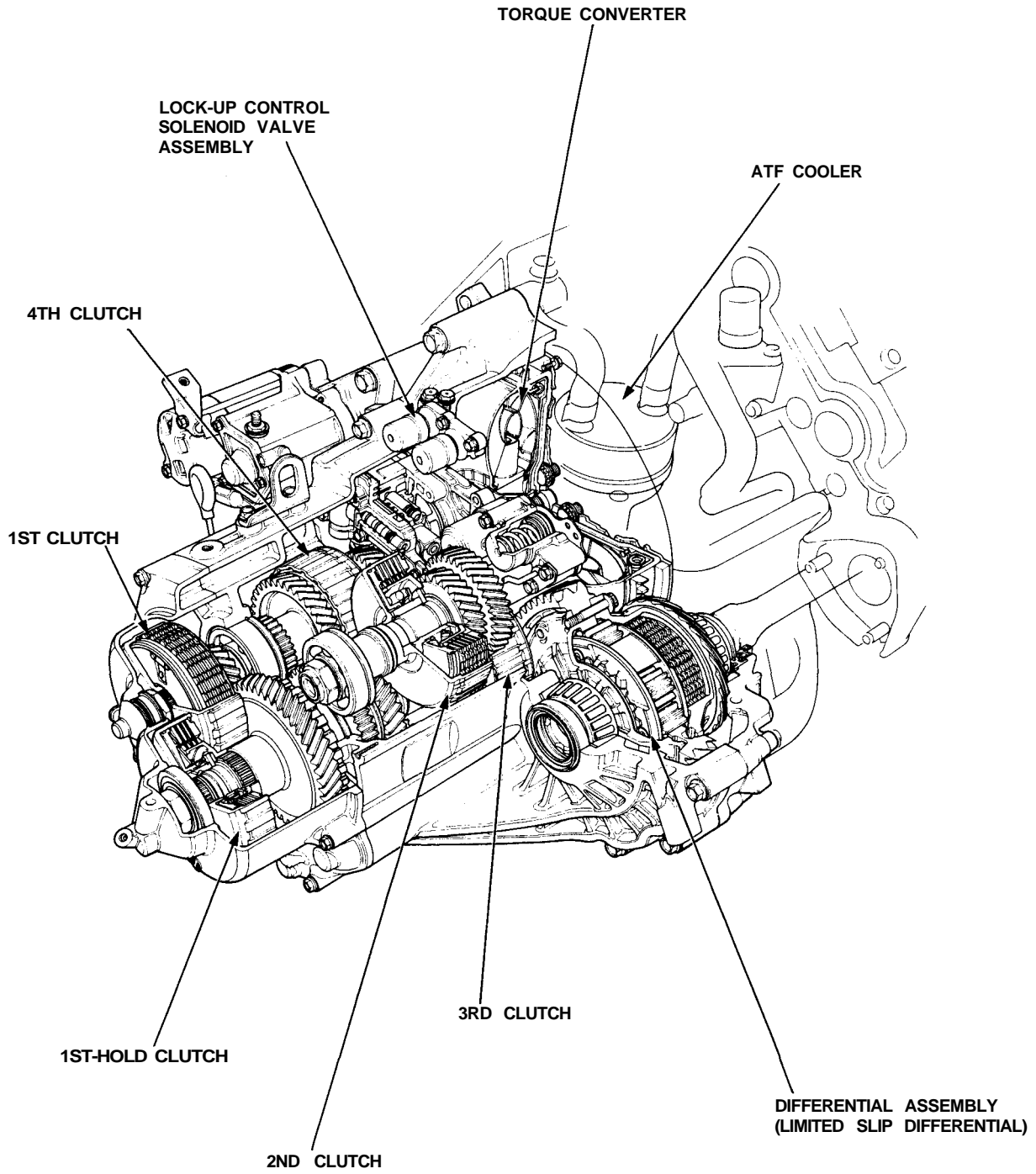
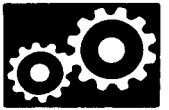
Starting is possible only in **P** and **N** position through use of a slide-type, neutral-safety switch.

## AUTOMATIC TRANSAXLE (A/T) GEAR POSITION INDICATOR

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

## ATF COOLER

With this mid-engine type car, the radiator is mounted at the front of the car, so the ATF cooler is installed directly on the transmission housing.



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