Modern Automotive Technology
Chapter 58
Automatic Transmission Service
Learning Objectives

- Troubleshoot an automatic transmission.
- Explain the types of problems common to an automatic transmission.
- Describe the tests needed to locate automatic transmission problems.
- Make basic external adjustments on an automatic transmission.
- Locate and repair automatic transmission leaks.
- Cite and observe safety rules while working on transmissions.
- Troubleshoot electronically controlled automatic transmissions.
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1. **Noises** from an automatic transmission may result from planetary gear troubles, damaged bearings, faulty torque converter, or loose components.

2. **Burned Transmission Oil** (Fluid) will be dark or black; darkness is normally caused by band and clutch friction material failure.
Planetary Gearset
Driving discs are splined to hub. Driven discs are locked in the drum.
Transmission Problems

- Frozen lockup clutch
- Damaged stator overrunning clutch
- Slipping clutch discs
- Worn, slipping bands
- Leaking rear seal
- Worn bushings
- Faulty governor
- Worn or damaged gearset
- Low oil level
- Sticking hydraulic valves
- Leaking front seal
- Loose converter fasteners
Check Oil Level

Feel, inspect, and smell fluid

Do not overfill. It only takes a pint of fluid to raise the level from *add to full*

Note: Do not overfill. It takes only one pint to raise level from add to full with a hot transmission.
Oil Condition

- Burned oil will be black or brown
  - caused by friction material failure due to slippage and overheating
- Milky oil indicates coolant mixing with the oil
  - caused by oil cooler leaking antifreeze into the oil
- Varnish is a light brown coating
  - oil is broken down, requiring oil change and possible transmission repair
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3. A Stall Test can be used to detect transmission slippage or a malfunctioning torque converter.

4. An Air Test can be used to further isolate problems in automatic transmission circuits.
Performing a Stall Test

Stall speed marked

Tachometer
Stall Test Results

- Engine speed should level out at a specified rpm
- Repeat briefly in each gear position
- Engine speed too high
  - transmission is slipping
- Engine speed too low
  - torque converter or engine performance problem
Performing an Air Test

Only use regulated air pressure. A dull thud should be heard. Hissing sound indicates a leak.
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5. Hydraulic Circuit Diagrams show how the oil passages inside an automatic transmission are connected to each other.

6. A Vacuum Test is used to check the operation of the vacuum modulator valve.
Hydraulic Circuit Diagram
Vacuum Test

- Measures vacuum reaching the valve
- To test:
  - connect a vacuum gauge to the modulator line with a T-fitting
  - with engine idling, reading should match manifold vacuum (high and steady)
- If reading is low, a vacuum leak may be present, the line may be blocked, or the modulator diaphragm may be ruptured
Vacuum Test

Connect a vacuum gauge to the modulator line with a T-fitting; with engine idling, reading should match manifold vacuum (high and steady)
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7. Low Fluid Level may cause the oil pump to pump air.

8. Automatic Transmission Slippage is frequently caused by misadjusted linkage, worn clutches or bands, or valve body problems.
Oil Pumps

Diagram showing components of an oil pump:
- Pump body
- Pump cover
- Drive gear
- Driven gear
- Front oil seal
- O-ring
- Gear pump
- Reaction shaft or stator support
- Inner rotor
- Outer rotor
- Oil pump body
- Seal rings
- Gasket
- Thrust washer
- Rotor pump
Check Linkages, Cables, and Lines
Shift Linkage Adjustment

Position the shifter and the lever on the transmission in the same gear.
9. Pressure Tests are used to determine whether oil pressures in the various transmission circuits are normal.

10. Incorrect Shift Pints can be caused by a faulty vacuum modulator circuit, engine performance problem, damaged governor, or trouble with hydraulic valves, servos, or pistons.
Pressure Tests

To test:

- connect a 300 psi (2000 kpa) gauge to the line pressure port
- run engine to operating temperature
- while applying the brakes, shift through all the gears while noting the pressures
- compare the readings to specs
Pressure Test Setup
Band

One end is anchored to the case
Transmission Rebuild

When rebuilding, refer to service manual procedures and diagrams
Vacuum Modulator Valve

Under high load, valve delays up shifts
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