Typically, pressure tests are the last thing you want to or need to do. In the early years of transmissions, a pressure test was often the first thing you did during your diagnostic routine.

What changed? Mostly the difference is computer control. Back before computers took over, a transmission problem was usually just that: a transmission problem. Very few external problems affected the transmission itself.

Today, fewer than half the cars that come in with a “transmission” problem actually have a problem in their transmissions. The source of the late or missed shifts is usually buried somewhere in the wiring that controls transmission operation.

That’s why we like to say that today, your first step in any transmission diagnosis is to determine whether the problem is inside or outside — is the problem inside the unit, or outside, somewhere in the rest of the vehicle? If it’s outside, there’s no reason to waste your time and the customer’s money performing pressure tests.

But once you’ve eliminated the external — the “outside” — there’s only one place left to look: inside. And that’s where a pressure test can be your most valuable ally.

In this issue of Keeping Up, we’re going to cover some facts about pressure testing, and some of the procedures that can help you isolate specific transmission problems.

**Pressure Tests**

A pressure test allows you to measure the fluid pressure in the different transmission circuits during various operating gears and gear selector positions. The number of hydraulic circuits that can be tested varies with each make and model. Some of these circuits include specific clutches, TCC operation, solenoid feed, and cooler pressure.

When diagnosing an internal transmission problem, there’s no substitute for a pressure test: by far the greatest value for diagnosing rough shifts or improper shift timing. Both of these problems may be caused by excessive line pressure, which can be verified by a pressure test.

When we talk about a pressure test, we’re speaking about mainline pressure, unless otherwise specified. Mainline pressure is the regulated pressure right from the pump, which provides hydraulic pressure to the rest of the components in the transmission.

### Understanding the Pressure Reading

During a road test, observe the starting pressures; they should start fairly low and increase steadily with engine load. Pay attention to how much the pressure drops as the transmission shifts. On most units, the pressure shouldn’t drop more than 15 PSI between shifts, and should recover as soon as the shift is complete.

Any pressure reading that isn’t within specifications indicates a problem:

- **If pressures are low,** look for an internal leak, a clogged filter, low pump output, or a faulty pressure regulator.
- **If pressure increases at the wrong time or the pressure isn’t high enough,** look for sticking valves or leaking seals.
- **If the pressure drops more than 15 PSI between shifts,** look for an internal servo or clutch leak.

To get to most out of a pressure test, begin by measuring mainline pressure in all gear ranges and at three basic engine speeds: idle, medium throttle, and wide-open throttle (WOT). If the pressure in all gears is within specifications at idle, the pump and pressure regulators are working fine. If all pressures are low at idle, look for a problem in the pump, pressure regulator, filter, fluid level, or an internal pressure leak.

To identify the problem further, check the pressure in the various gears at medium throttle. If the pressures are now within specifications, the problem is usually a worn oil pump, but it may be an internal leak.

Internal leaks are often more evident in a specific gear range, because that’s when ATF applies the leaking circuit. If there’s a leak in a particular clutch circuit, pressure will drop in that gear range, or when the transmission operates in that gear.

Some transmissions have taps for individual clutch circuits. In that case, you can further isolate circuit problems by checking the pressure in those circuits. Clutch apply pressure should equal mainline after the shift is complete. If the clutch apply pressure is low, it indicates a leak in that circuit.

You can learn even more by observing the pressure change at wide-open throttle in each gear range. A clogged oil filter will normally cause a gradual...
drop at higher engine RPM, because the fluid can’t pass through the filter fast enough to keep up with the pump.

If the pressure only changes slightly with the increase in engine RPM, look for a stuck pressure regulator or one of the pressure control devices, such as the TV, modulator or EPC solenoid. In this case, pressure will build with increased engine RPM, but won’t provide the necessary boost pressures.

If the pressures are high at idle, look for a faulty pressure regulator or throttle valve problem.

If pressures are low at stall, your next test depends on the pressure control system:

• If the system uses a throttle valve (TV) cable or linkage, pull the cable or linkage all the way out. If pressure rises properly, check the linkage or cable adjustment.
• If the system uses a vacuum modulator, disconnect the vacuum hose to the modulator. If pressure rises to maximum, check the vacuum signal, modulator adjustment, or replace the modulator.
• If the system is controlled electronically, disconnect the transmission bulkhead connector. If this causes the pressure to rise to maximum, check the EPC electrical signal, or suspect an EPC control problem.

In every case, if the pressures remain below specifications, the most likely cause is the pump or control system.

If all pressures are high at stall, compare the readings to those at idle. If they’re high at idle and stall, look for a problem in the pressure regulator or throttle system.

If the pressures are normal at idle and high at WOT, look for a problem in the throttle system.

To verify a weak or worn oil pump, perform a stall test in reverse. If the pressures are low during this test but normal during all other tests, suspect a weak pump.

Pressure testing the transmission might not be your first step in a transmission diagnosis, but as you can see the pressures can be the most important step you take to identify internal transmission failures. Until next time, keep on Keeping Up!

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### QUIZ

1. Tech A says low mainline pressures could indicate a sticking pressure regulator valve.
   Tech B says high mainline pressures could indicate a sticking pressure regulator valve.
   Who’s right?
   A. A only
   B. B only
   C. Both A and B
   D. Neither A nor B

2. Tech A says, if the pressure remains low after a shift is complete, it could indicate a leaking clutch circuit.
   Tech B says, if the transmission has individual clutch circuit taps, the clutch circuit should always be about 15 PSI below mainline.
   Who’s right?
   A. A only
   B. B only
   C. Both A and B
   D. Neither A nor B

3. Unplugging the EPC solenoid will:
   A. Cause pressures to drop to minimum.
   B. Cause pressures to rise to maximum.
   C. Nothing: The EPC doesn’t affect pressure at idle.
   D. It depends on the specific transmission.

4. At wide open throttle, mainline pressure rises to maximum, then slowly drops off. This indicates a:
   A. leaking pump circuit.
   B. leaking clutch circuit.
   C. sticking pressure regulator.
   D. clogged filter.

5. Tech A says a weak pump will usually cause pressure to be low all the time.
   Tech B says the best way to verify a weak pump is by running a stall test in reverse.
   Who’s right?
   A. A only
   B. B only
   C. Both A and B
   D. Neither A nor B