

A Look at the 6L80;

Part 3 of 3



by Steve Garrett

Internal Transmission Diagnosis

Hydra-Matic
2006 6L80 (MYC)
Six Speed RWD Automatic Transmission
Cutaway Display for Cadillac STS-V

Over the last few issues, we've taken a look at GM's 6-speed, rear wheel drive transmission. We did a complete overview of its systems and operation, and went over the scan data that's available through an up-to-date scan tool.

In this issue, we'll close out our series by looking over some of the more unusual aspects of diagnosis and service for this transmission. We'll start with the speed sensors:

Speed Sensors

The 6L80 uses two speed sensors: an input (ISS) and an output (OSS) speed sensor (figure 1). Both sensors are combined as an assembly and are mounted under the valve body. Both are Hall Effect sensors. Since the sensors are hard to reach for testing, GM recommends using a signal generator: a tool that creates a substitute signal for the sensor. This test tool is available from several different tool suppliers.

To test the speed sensor operation using a signal generator:

- Remove the TCM (TEHCM) and valve body from the transmission.
- Connect the signal generator to the TCM pins, so it takes the place of the speed sensor in question.
- Connect a scan tool to the TCM using the jumper harness in the DT 47825 tool kit (figure 2).
- Select an 8-volt square wave for the signal generator output.

As you increase the frequency setting on the signal generator, look for a corresponding change in the speed reading on the scan tool:

- If the speed changes on the scan tool, look for a faulty sensor or a speed sensor connection.
- If the speed on the scan tool fails to change with the frequency on the signal generator, or fails to

read at all, suspect a faulty TCM (TEHCM).

TCM (TEHCM)/Valve Body Diagnosis

A special tool has been released to help you diagnose internal problems in the 6L80. By using the DT 47825 air test plate (figure 3), shop air, and a capable scan tool, you should be able to isolate problems in the solenoid block and valve body. To use the tool:

- Remove the TCM/valve body assembly.
- Connect the scan tool connector to the TCM electrical connector via the jumper harness provided.
- Install and torque the DT 47825 test plate to the valve body; 44 in-lbs (5 Nm).
- Connect your shop air pressure, regulated to 90-100 PSI, to the test plate.
- Use your scan tool to command the solenoids on and off while

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NOTE: Fast learn isn't required if you're installing a new or rebuilt GM 6L80. The transmission is fast learned prior to being shipped from the plant.

monitoring the pressure gauge on the test plate. Compare your readings to the table.

- Move the pressure gauge to each port and repeat the process. (Chart 1)

If there's a problem with the solenoid or valve, the gauge pressure won't change as you cycle the solenoid. If you identify a problem, replace the complete control solenoid valve assembly.

Adaptive Learning

The 6L80 is fully equipped with several adaptive learning strategies. As with some other GM applications, you'll need to erase the adaptive values and perform a Fast Learn before delivering the vehicle. Always perform adaptive and fast learn procedures after any of these situations:

- Internal transmission repairs have been performed.
- The valve body was replaced.
- The control solenoid valve assembly was replaced.
- The TCM (TEHCM) was recalibrated or replaced.
- Internal repairs were performed that could affect shift quality.

Solenoid	Test Plate Port	Key On, Engine Off (KOEO) Normal State	Commanded State	
Line PC Solenoid 1	G	No Flow to Gauge	On: 10-15 PSI (68-103 kPa) per Commanded Amp	
PC Solenoid 2	C	No Flow	On: Full Flow	Off: No Flow
PC Solenoid 3	A	Full Flow	On: Full Flow	Off: No Flow
PC Solenoid 4	B	No Flow	On: Full Flow	Off: No Flow
PC Solenoid 5	F	No Flow	On: Full Flow	Off: No Flow
Shift Solenoid 1	H	No Flow	On: Full Flow	Off: No Flow
Shift Solenoid 2	D	No Flow	On: Full Flow	Off: No Flow
TCC PC Solenoid	E	No Flow	On: Full Flow	Off: No Flow

Chart 1

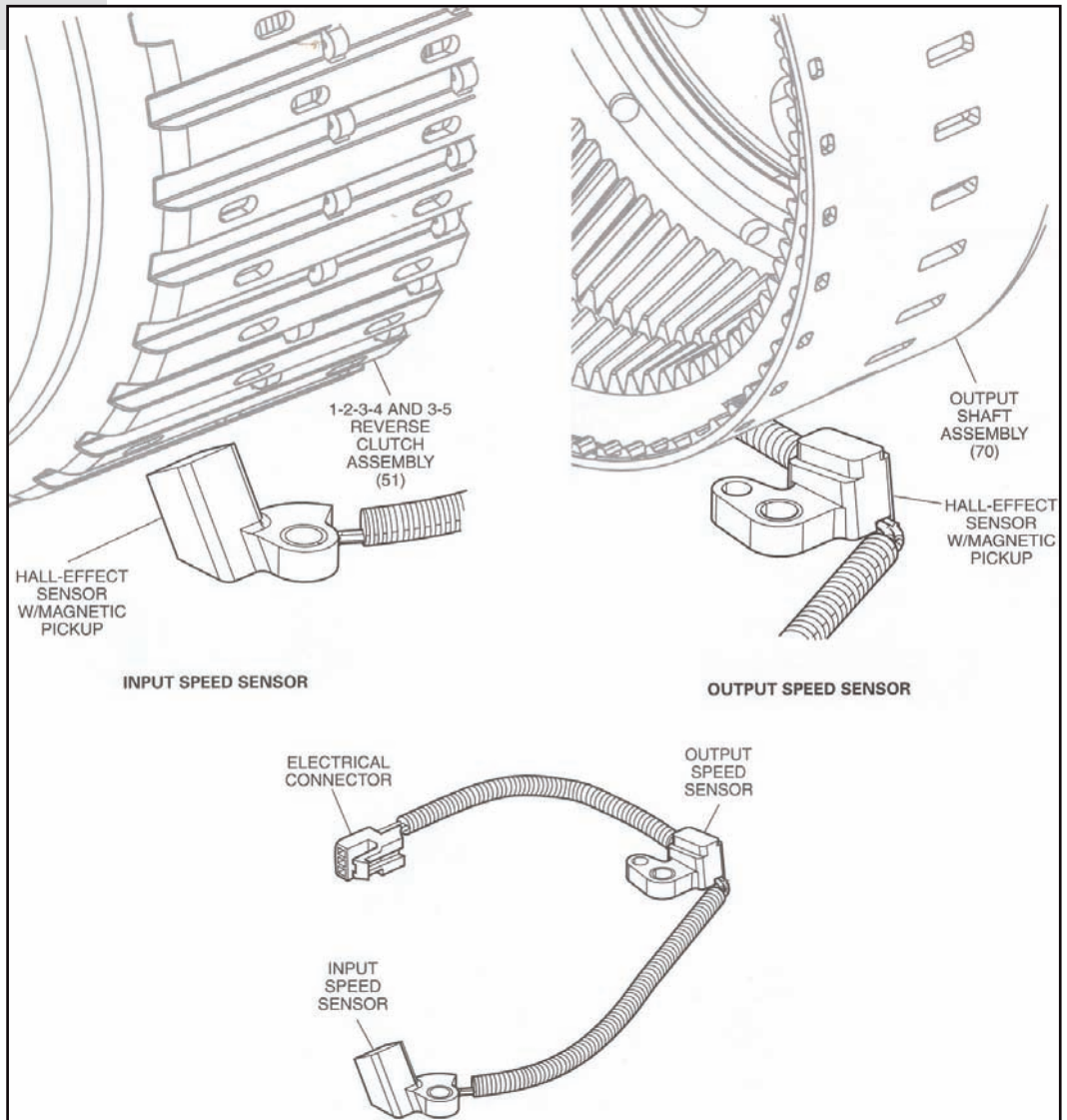


Figure 1

NOTE: Fast learn isn't required if you're installing a new or rebuilt GM 6L80. The transmission is fast learned prior to being shipped from the plant.

To perform a fast learn, you'll need a scan tool capable of performing the fast learn procedure. Here's how to

perform a fast learn:

- Start the engine.
- Bring the transmission temperature to 158-230°F (70-110°C).
- Select Fast Learn process from the scan tool menu.
- Place the transmission in drive with the vehicle stationary. The



Figure 2

TCM will individually apply the clutches and calculate the clutch volume.

- Place the transmission in reverse with the vehicle stationary. The TCM will individually apply the clutches and calculate the clutch volume.
- Shut the engine off.
- Turn your scan tool off.
- Open and close the driver's door (allows Retained Accessory Power (RAP) to expire).

That's all there is to it; the fast learn process is complete.

The fast learn procedure won't run if:

- There are any DTCs set in memory.
- TFT isn't between 158-230°F (70-110°C).
- The brake switch isn't working.
- Throttle position remains at 0% but engine RPM increases during the test.
- The park/neutral switch is adjusted improperly or isn't working correctly.

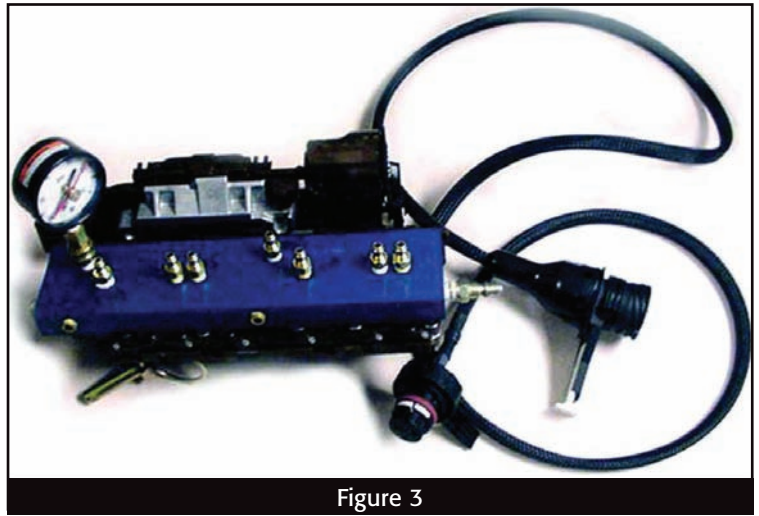


Figure 3

- The line pressure control system isn't working properly.

As you can see, diagnosing one of these units isn't as difficult as it might seem. As with so many other things, having the right tools and a good understanding of the systems you're working on will make the job much easier... and more profitable.



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