



Transmission: 4L80E
Subject: Updates
Application: Chevrolet
Issue Date: 1995

4L80E

Updates

Many electrical changes have occurred in the 4L80E transmission for the 1994 model year, these include:

- A new pressure control solenoid.
- New shift solenoids, A&B.
- A new wiring harness and connector.
- Changes in vehicle speed sensor circuitry and components.
- Addition of a 4WD switch on all 4WD models.
- New codes for transmission faults.
- APP sensor was added.

Pressure Control Solenoid

Beginning with the start of production for the 1994 model year all 4L80E models were equipped with a new designed pressure control solenoid (force motor). 1991-93 model units were equipped with a unit built by Bosch, which can be identified by its silver colored exterior. The new pressure control solenoid is manufactured by Holley and can be identified by its black

colored exterior. Internally, the solenoids vary greatly. The size of the spool valve has been increased and a spring was added to eliminate the need for the 10-second cleaning pulse. (Figure 1)

To accommodate this change, the oil channeling for the solenoid has been changed. This change removes the balance oil from the end of the solenoid, which means the Bosch unit must not be used to replace a Holley solenoid or high line pressure will result. In addition, the resistance of the new solenoid is slightly higher at 3-8W. With this slight increase in resistance, you will notice the duty cycle reading on your scanner or meter is also slightly higher while the amperage/pressure values remain the same as the Bosch Units. The duty cycle values for the Holley will normally read about 50 to 70% at idle and decrease as load is increased.

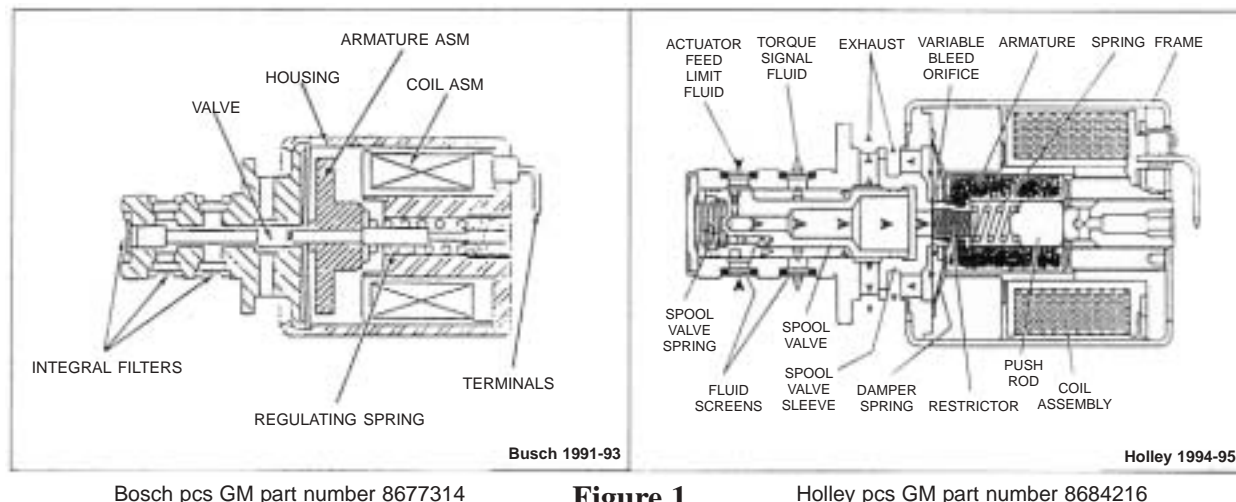


Figure 1

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Shift Solenoids A (1-2) B (2-3)

In November 1993 (94 models), all 4L80E transmissions were equipped with updated shift solenoids. This third design solenoid change is identified by new color codes.

First design, solenoid 'A'-BLUE, solenoid 'B'-RED

Second design, solenoid 'A'-GRAY, solenoid 'B'-GREEN

Third design, solenoid 'A'-PURPLE, solenoid 'B'-TAN

This update was made to increase solenoid reliability. The updated solenoids can be used on any model year 4L80E unit. Third design GM part numbers: Solenoid 'A' 24201004, solenoid 'B' 24201005.

New Wiring Harness Connector

To reduce the possibility of leakage and multiple code storage a new connector was added to all 4L80E models. (Figure 2).

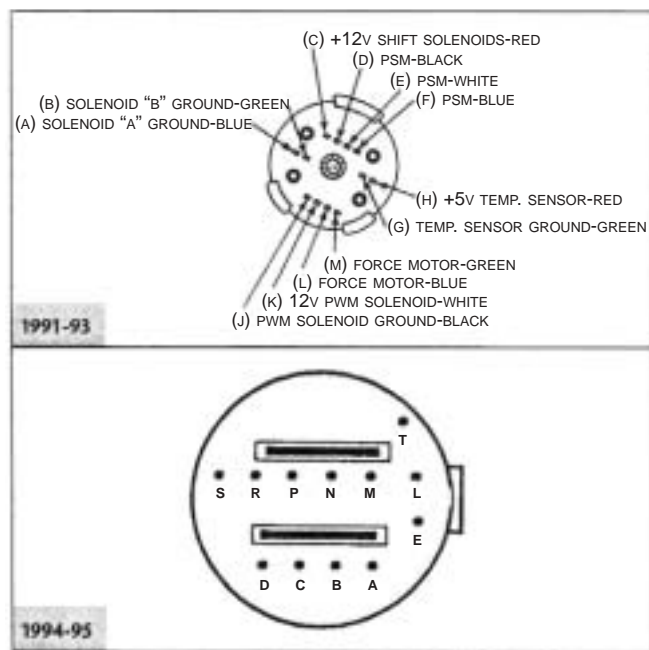


Figure 2

CAVITY	
A	1-2 Shift Solenoid Control Circuit
B	2-3 Shift Solenoid Control Circuit
C	Pressure Control Solenoid (High)
D	Pressure Control Solenoid (Low)
F	Both Shift Solenoids, TCC Solenoid, Ignition (B+) Feed Circuit
L	Transmission Fluid Temperature (TFT) Signal Circuit
M	Transmission Fluid Temperature (TFT) Sensor Ground Circuit
N	Range Signal 'A' Circuit
P	Range Signal 'C' Circuit
R	Range Signal 'B' Circuit
S	TCC PWM Solenoid Control Circuit

Vehicle Speed sensor Circuits

As of start of production 1994, all 4L80E models underwent changes to their vehicle speed wiring circuits. These changes included dropping the transmission output speed sensor and toothed wheel on 4WD units, as well as significant wiring and circuit changes in 2WD and 4WD applications.

All 4WD units now use only output speed sensor (located at the transfer case) rather than sensors at the transfer case and the transmission output shaft. Since the output toothed wheel was also dropped (Figure 3), care must be taken not to interchange output planetary carrier assemblies between output VSS and non output VSS equipped units. Attention must also be given when replacing a unit with a rebuilt transmission to assure the transmission is properly equipped with or without a toothed sensor wheel.

If the wrong transmission part number or a carrier unit without a toothed wheel is installed in a 1991-93 vehicle, late/no upshifts may result.

NOTE: Late upshifts may result due to the sensor picking up a 21 pulse per rotation signal from the machined slots cut in the output planetary assembly, rather than the normal 40 pulse per rotation signal the PCM/TCM experts to see.

Both 1994-95 4WD and 2WD vehicles use the same wiring layouts for their output vehicle speed sensor circuits. (Figure 4)

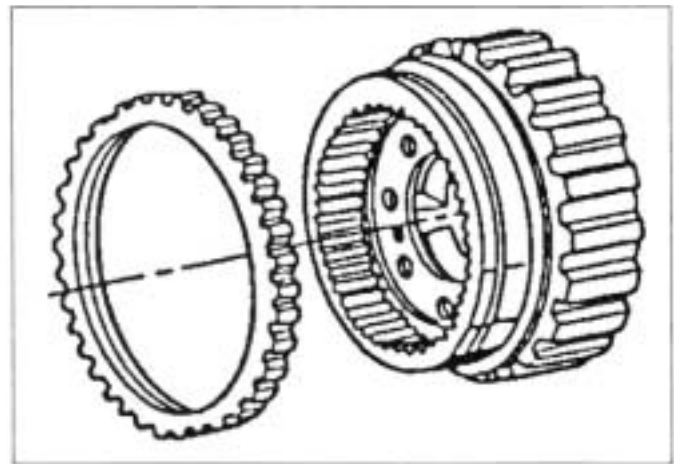


Figure 3

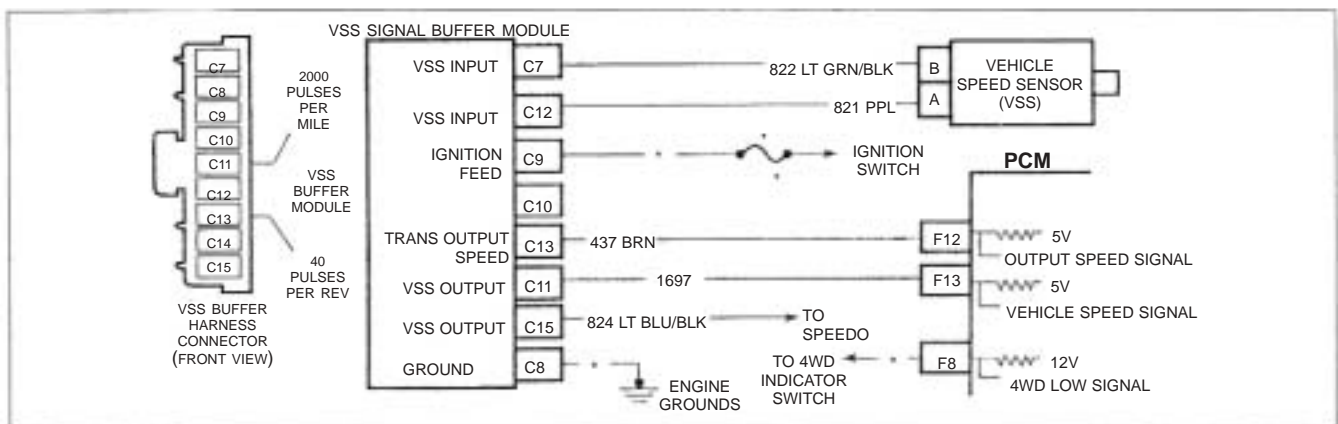


Figure 4

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4 Wheel Drive Circuit

In conjunction with the VSS circuit changes, all 1994-95 4L80E 4WD applications have added an additional switch as an input to the PCM. This switch (and its circuit) eliminates the need to use a transmission output speed sensor and a transfer case speed sensor to determine when the vehicle was placed in 4WD LOW range as on 1991-93 vehicles.

As previously mentioned, the transmission output speed sensor has been dropped from all 94-95 4WD models. 4WD LOW range is now determined by monitoring a circuit designed exclusively for that purpose.

To accomplish this, the switch at the back of the transfer case, which was used to energize the front drive axle thermal actuator, has an additional set of contacts and an additional wire which signals the PCM when the 4WD LOW range is selected. (Figure 5)

During ranges other than LOW, the switch remains open and the PCM feed circuit 1493 remains at battery voltage.

As the Low range is selected, the transfer case switch grounds circuit 1493. This pulls the signal voltage at the PCM low and signals the PCM to change the vehicle up/down shift points to accommodate the change to 4WD LOW range. 4WD LOW switch position is indicated as a scan tool parameter on 94-95 vehicles.

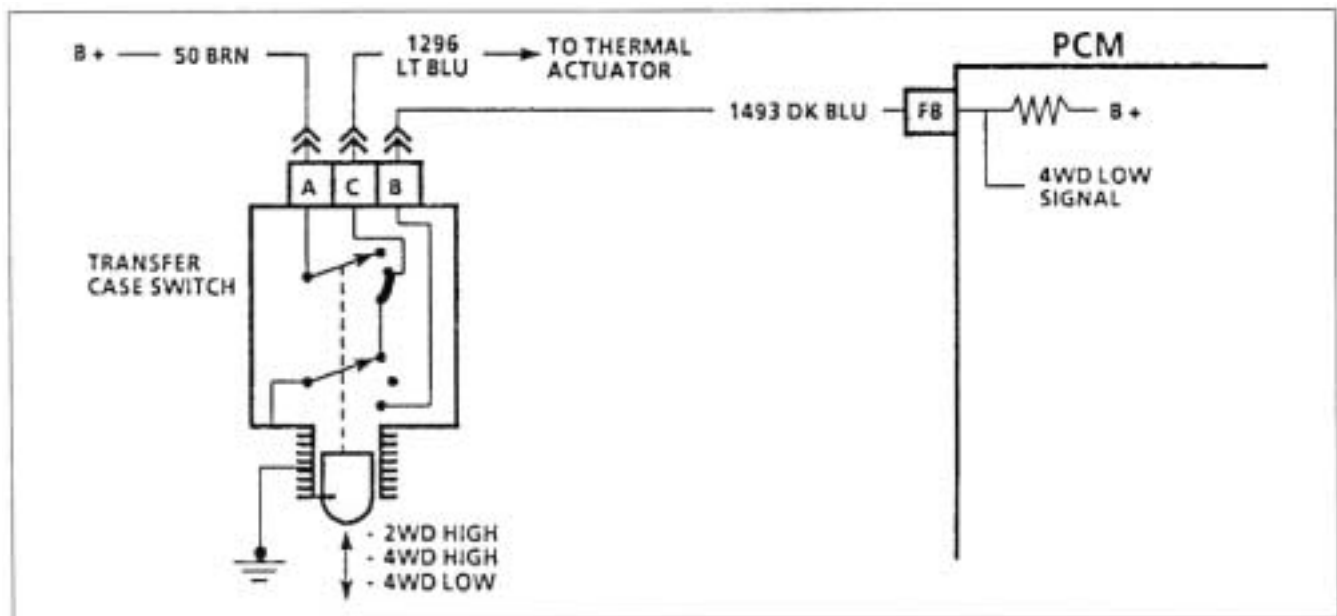


Figure 5

Additional Codes

6-17 new diagnostic trouble codes were added for 1995 models.

CODE 37 - Brake Switch Stuck ON Parameters:

- PCM receives an input signal of 0 volts from the brake switch circuit.
- Vehicle speed was less than 5mph then rises to more than 20mph, time interval of more than 6 seconds is met at each step.
- The above conditions are repeated 7 times.

CODE 38 - Brake Switch Stuck OFF Parameters:

- Brake switch circuit input to the PCM indicates battery voltage all the time.
- Vehicle speed exceeds 20mph then drops to less than 5mph; time interval of six seconds or more is met at each step.
- The above conditions were repeated seven times.

If code 37 or 38 sets the PCM will respond by:

- Inhibiting TCC.
- Inhibiting fourth gear in hot mode.

CODE 69 - TCC Stuck ON Parameters:

No codes 21,22,28,74 are set.

TCC slip indicates TCC is ON.

TCC is commanded OFF.

TP sensor indicates load greater than 25%.

D-4 or D-3 range is indicated.

PCM commands unit to second or third gears.

The above conditions are present for more than two seconds.

NOTE: No PCM default actions are taken for code 69.

CODE 72 - VSS Signal Loss Parameters:

Code 28 is not set.

Engine running, transmission indicates a forward or reverse range has been selected.

Output sensor signal changes by 1000 rpm or more within two seconds.

or

Code 28 is not set.

Engine running, transmission indicates neutral or park range has been selected.

Output sensor signal changes by 2050 rpm or more within two seconds.

If code 72 sets, the PCM will respond by:

Commanding second gear only.

Commanding line pressure to maximum.

CODE 74 - Input Speed Sensor Parameters:

Codes 24 or 28 are not set.

Forward or reverse ranges indicated.

Engine is running.

Output speed greater than 200 rpm.

Input speed sensor indicates less than 50 rpm for more than two seconds.

If code 74 sets, the PCM will respond by:

Inhibiting TCC.

CODE 79 - Transmission Fluid Overtemp Parameters:

Code 58 is not set.

Fluid temperature indicates above 146° C, 295° F for more than 30 minutes.

NOTE: No default actions will be present for code 79.

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Accelerator Pedal Position Sensor

The 6.5 liter electronic fuel injected diesel engine was introduced as a replacement for the 6.2 liter diesel in most applications. This engine touts a technology never before seen in the GM light duty line, drive by wire. Instead of using a throttle cable to control the injector pump, the 6.5L EFI uses a pod of throttle position sensors known as an accelerator pedal position sensor (APP).

The APP sensor is mounted inside the passenger compartment and has the accelerator pedal attached to it. (Figure 6)

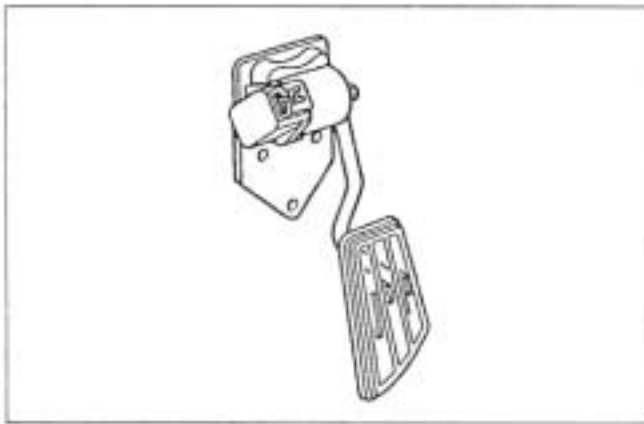


Figure 6

The APP sensor houses three potentiometers which are used to measure the percentage of throttle opening. (Figure 7)

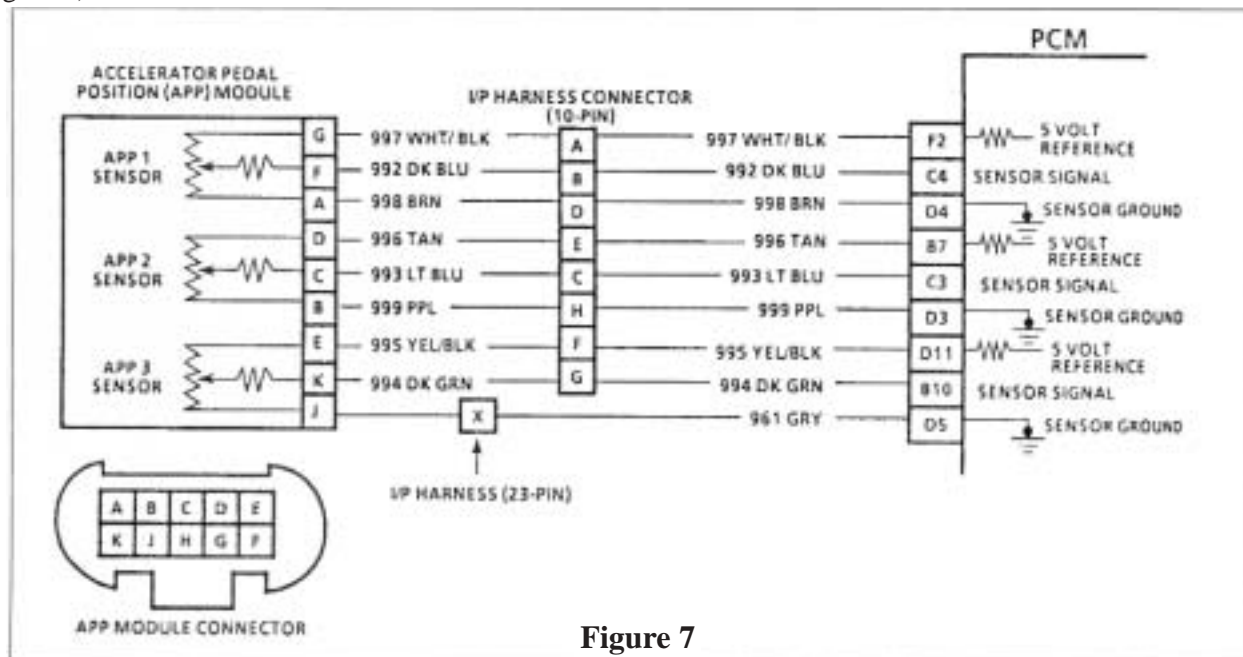


Figure 7

APP #1 reads approximately .5 volts at idle and climbs steadily to approximately 4.0-4.25 volts at wide open throttle.

APP #2 will produce a signal of approximately 4.5 volts at idle and decrease steadily to about 1.25 volts or less at wide open throttle.

APP #3 provides a signal of approximately 4 volts at idle which decreases steadily to approximately 2.25-2.0 volts at wide open throttle. (Figure 8)

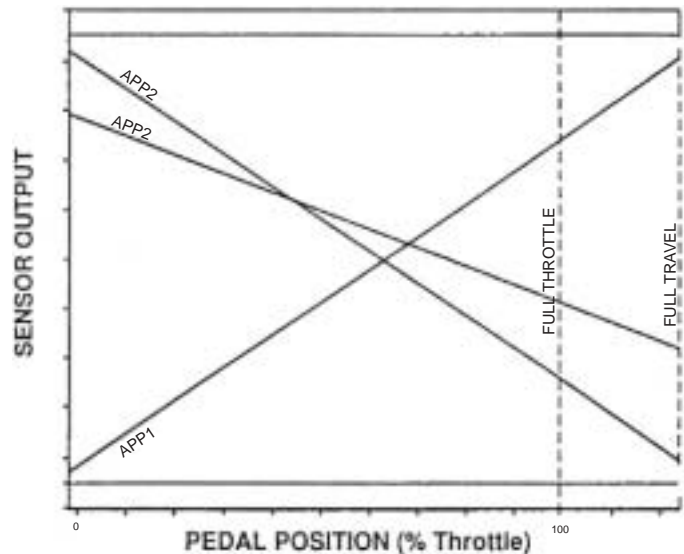


Figure 8

Eleven different trouble codes are used to describe problems within the APP sensor or circuits.

Malfunctions within the APP sensor/circuit may have dramatic effects on how well the transmission performs since the sensor acts as the load input to the PCM. The codes are:

Code 21-APP sensor #1 voltage greater than 4.75 volts for 2 seconds or more.

Code 22-APP sensor #1 voltage less than .25 for 2 seconds or more.

Code 23-APP sensor #1 indicates more than 6% difference from sensor #2 and a 10% difference when compared to sensor #3.

Code 25-APP sensor #2 voltage greater than 4.75 volts for 2 seconds or more.

Code 26-APP sensor #2 voltage less than .25 volts for 2 seconds or more.

Code 27-APP sensor #2 indicates more than 6% difference from #1 and a 10% difference when compared to sensor #3.

Code 63-App sensor #3 voltage greater than 4.75 volts for 2 seconds or more.

Code 64-APP sensor #3 voltage less than .25 volts for 2 seconds or more.

Code 67- APP sensor 3 indicates more than 6% difference when compared to sensor #2.

Code 84-Indicates an intermittent fault exists. This code will only set if no other APP sensor codes are set. This code can set if codes 17, 18, 19, 34, 35 or 36 are set. If code 84 is set in conjunction with any of the above codes it is most likely a false code.

Code 99- APP sensor #2 reference voltage less than 4.8 volts for 2 seconds.

Many different transmission default actions can occur if any of the previous codes are set. In addition, other driveability symptoms may also result such as:

#1 APP sensors faulty, no service throttle light, reduced power and poor throttle response.

#2 APP sensor faulty, service throttle soon light on, reduced power, limited to about 50%. Some #2 codes will result in the engine dropping back to curb idle when throttle is above 5% and the brake is applied.

#3 APP sensor faulty, service throttle soon light on, idle fuel delivery available only, which leads to a major lack of power complaint. (Some scan tools can be used to override this fault so the vehicle may be driven to the repair facility.)