Component Procedures: Control Module

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Transmission Control Module Scan Tool Information (6L45/6L50/6L80/6L90) (Article 10795)

The Transmission Control Module Scan Tool Data List contains all transmission related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists, and in some cases may appear more than once, or in more than one data list in order to group certain related parameters together.

The values below represent a typical display recorded from a properly functioning system.

Only the parameters listed below are used/referenced in this manual for diagnosis. If a scan tool displays other parameters, those values are not recommended by General Motors for use in diagnosis.

If all values are within the expected value described below, refer to Symptoms - Automatic Transmission for diagnosis.

The scan tool values from a properly functioning transmission may be used for comparison with the transmission you are diagnosing. The values below represent a typical display recorded from a properly functioning system.

Parameter System State Expected Value Description

Operating Conditions: Engine at idle with the upper radiator hose hot and in closed loop operation, closed throttle, transmission in Park, accessories OFF, brake pedal not applied.

1–2 Shift Time Varies Seconds This parameter displays the actual time of the last adaptable 1–2 shift. The shift time is based on the gear ratio change after the commanded 1–2 shift.

2–3 Shift Time Varies Seconds This parameter displays the actual time of the last adaptable 2–3 shift. The shift time is based on the gear ratio change after the commanded 2–3 shift.

3–4 Shift Time Varies Seconds This parameter displays the actual time of the last adaptable 3–4 shift. The shift time is based on the gear ratio change after the commanded 3–4 shift.

4–5 Shift Time Varies Seconds This parameter displays the actual time of the last adaptable 4–5 shift. The actual shift time is obtained by measuring the time required for the input shaft to decelerate from the previous ratio to the current ratio.

5–6 Shift Time Varies Seconds This parameter displays the actual time of the last 5–6 shift. The shift time is base on the gear ratio change after the commanded 5–6 shift.

Brake Switch Released Applied/Released This parameter displays the status of the brake switch circuit input. Applied indicates a zero voltage input, brake pedal applied. Released indicates a voltage input, brake pedal released. The scan tool displays Applied or Released.

Calc. Throttle Position Varies % This parameter displays a calculated value, which is determined by the accelerator pedal position and the actual throttle position, used to optimize transmission controls. It represents the driver’s intended request for torque or acceleration. The range is 0–100 percent, where 0 percent represents an idle or coast request and 100 percent represents a request for wide open throttle (WOT).

Commanded Gear 1 1, 2, 3, 4 or 1, 2, 3, 4, 5 or Park/Neutral, Reverse, 1, 2, 3, 4, 5 This parameter displays the current commanded state of the shift solenoid valve s. The scan tool displays 1, 2, 3, 4 or 5

Driver Shift Control Inactive Active/Inactive This parameter displays Active or Inactive. The scan tool displays Active when the gear selector is in the sport (S) position, which enables TAP shift. The scan tool displays Inactive when the gear selector is not in the S position, TAP shift disabled.

Driver Shift Request None Upshift/ Downshift/ None/ Invalid This parameter displays the current request from the TAP Shift System. This parameter will display up shift, downshift or invalid depending on the amount of voltage measured at the remote shift selector input and also will display none when there is no request.

ECT Varies °C (°F) This parameter displays the input signal from the engine coolant temperature (ECT) sensor. ECT is high at 151°C (304°F) when the signal voltage is low (0 V). ECT is low at −40°C (−40°F) when the signal voltage is high (5 V).

Engine Speed Varies RPM This parameter displays the rotational speed of the engine expressed as revolutions per minute.

Engine Torque Varies Nm (lb ft) This parameter displays a calculated value based on engine load, throttle position, mass air flow , and other engine inputs. This parameter is accurate to within 20 Nm 15 lb ft of actual measured engine torque.

Gear Ratio Varies Ratio This parameter displays the actual transmission gear ratio. The scan tool displays the gear ratio calculated from the automatic transmission input shaft speed sensor (AT ISS) and the automatic transmission output shaft speed sensor (AT OSS) inputs.

High Side Driver 1 Enabled Enabled/Disabled This parameter displays the High Side Driver 1 status on the scan tool. When the High Side Driver 1 is commanded OFF this displays Disabled, when the High Side Driver 1 is commanded ON this displays Enabled.

High Side Driver 1 CKT Status OK or Indeterminate OK, Open/Short to Volts, Short to GND, Indeterminate This parameter displays the High Side Driver 1 circuit status on the scan tool. If the voltage is low when the solenoid is commanded OFF, the scan tool will display Open/Short to GND. If the voltage is high when the

solenoid is commanded ON, the scan tool will display Short to Volts. If no circuit fault is present the scan tool will display OK.
Ignition Voltage 12 to 14 volts Volts This parameter displays the system voltage measured at the ignition feed.
IMS Park Park–Drive 1, Open, Invalid This parameter displays PARK, PARK/REVERSE, REVERSE, REVERSE/NEUTRAL, NEUTRAL, NEUTRAL/DRIVE 4, DRIVE 4, DRIVE 4/DRIVE 3, DRIVE 3, DRIVE 3/DRIVE 2, DRIVE 2, DRIVE 2/DRIVE 1, DRIVE 1 or INVALID. The IMS Range display represents a decoded status of the four inputs from the IMS. The combination of IMS inputs are used to determine what position the manual valve is in at any time.
IMS A/B/C/P LOW/HI/HI/LOW HI or LOW This parameter displays the status of the four A/B/C/P inputs from the automatic transmission internal mode switch. HI indicates an ignition voltage signal and LOW indicates a 0 voltage signal. The scan tool will display HI/LOW, HI/LOW, HI/LOW, HI/LOW.
ISS/OSS Supply Voltage OK OK, Out of Range This parameter displays OK, Out of Range.
Last Shift Time Varies Seconds This parameter displays the actual time of the last up shift. This value is only accurate if the shift was adaptable.
PC Sol. 2 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 2 Pressure Comm No Yes/No This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 3 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 3 Pressure Comm Yes Yes/No This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 4 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 4 Pressure Comm No Yes/No This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
PC Sol. 5 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts.
PC Sol. 5 Pressure Comm No Yes/No This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
Shift Sol. 1 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts, or Indeterminate.
Shift Solenoid 1 ON On/Off This parameter displays the commanded state of the reverse, 1st shift solenoid valve (S1). The scan tool displays On/Off.
Shift Sol. 2 CKT Status OK or Indeterminate OK, Open/Short to GND, Short to Volts, Indeterminate This parameter displays OK, Open/Short to GND, Short to Volts, or Indeterminate.
Shift Solenoid 2 ON On/Off This parameter displays the commanded state of the 2–3, 3–4 shift solenoid valve (S2). The scan tool displays On/Off.
TCC PC Sol. Pressure Comm No Yes/No This parameter displays Yes or No. Yes, solenoid pressure is commanded. No, solenoid pressure is not commanded.
TCC Slip Speed Varies RPM This parameter displays the difference between transmission input speed and engine speed. A negative value indicates that the engine speed is less than the input speed, deceleration. A positive value indicates that the engine speed is greater than the input speed, acceleration. A value of zero indicates that the engine speed is equal to the input speed, TCC applied.
TCM Temperature Varies °C (°F) This parameter displays results in °C (°F).
TFP Switch 1 HI HI/LOW This parameter displays the state of the first clutch oil pressure switch . The scan tool displays HI/LOW.
TFP Switch 3 LOW HI/LOW This parameter displays state of the 3rd clutch oil pressure switch. The scan tool displays HI/LOW.
TFP Switch 4 LOW HI/LOW This parameter displays state of the 4th clutch oil pressure switch. The scan tool displays HI/LOW.
TFP Switch 5 LOW HI/LOW This parameter displays state of the fifth clutch oil pressure switch. The scan tool displays HI/LOW.
Tow/Haul Mode (If equipped) Inactive Active/Inactive This parameter displays ACTIVE when the transmission is operating in the tow/haul mode. In this mode the transmission control module (TCM) extends the length of time between upshifts and elevates transmission line pressure. Shift quality and TCC scheduling are also affected during tow/haul mode operation. The scan tool displays ACTIVE or INACTIVE.
Trans. Fluid Temp. Varies °C (°F) This parameter displays the input signal of the transmission fluid temperature sensor. Transmission fluid temperature is high 151°C (304°F) when signal voltage is low, 0 V, and transmission fluid temperature is low −40°C (−40°F) when signal voltage is high, 5 V.

Transmission ISS Varies RPM This parameter displays the rotational speed of the transmission input shaft. The scan tool displays input shaft speed is revolutions per minute.
Transmission OSS 0 RPM This parameter displays the rotational speed of the transmission output shaft expressed as revolutions per minute.
Output Control Description
High Side Driver 1 The TCM commands the driver for the solenoid voltage supply ON and OFF. When the ignition is ON, and the engine is OFF, there are no limits to this control. High side drivers may not be commanded ON and OFF with the scan tool if the engine is running.
- The TCM commands the driver for the solenoid voltage supply ON and OFF.
- When the ignition is ON, and the engine is OFF, there are no limits to this control.
- High side drivers may not be commanded ON and OFF with the scan tool if the engine is running.
Line PC Solenoid The scan tool is used to request pressure in increments of 200 kPa (30 psi) from 200–2000 kPa (30–290 psi). The TCM will then command the line PC solenoid to achieve the requested increment. When the ignition is ON, and the engine is OFF, the pressure request may be controlled within calibrated limits. There is a limit to the output control of 200 kPa (290 psi) when the engine is OFF. If the request is above specified amount, the message “Request override current out of range” will display. When the engine is running, the following control limits apply: When the transmission range is Park or Neutral, the pressure request may be controlled within calibrated limits. The engine speed must be less than 1,500 RPM. If the engine speed is greater than 1,500 RPM, the message "TR in park/neutral and engine speed over 1,500 RPM" appears on the scan tool display. When the transmission range is not Park or Neutral, the requested pressure can only be controlled equal to or greater than the pressure determined by the TCM. The TCM does not allow a pressure to be selected that may cause damage to the transmission. If the requested pressure is less than allowed by the TCM, the message "Requested pressure for the Line PC Solenoid is too low" appears on the scan tool display. Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
- The scan tool is used to request pressure in increments of 200 kPa (30 psi) from 200–2000 kPa (30–290 psi). The TCM will then command the line PC solenoid to achieve the requested increment.
- When the ignition is ON, and the engine is OFF, the pressure request may be controlled within calibrated limits. There is a limit to the output control of 200 kPa (290 psi) when the engine is OFF. If the request is above specified amount, the message “Request override current out of range” will display.
- When the engine is running, the following control limits apply:
- When the transmission range is Park or Neutral, the pressure request may be controlled within calibrated limits. The engine speed must be less than 1,500 RPM. If the engine speed is greater than 1,500 RPM, the message "TR in park/neutral and engine speed over 1,500 RPM" appears on the scan tool display.
- When the transmission range is not Park or Neutral, the requested pressure can only be controlled equal to or greater than the pressure determined by the TCM. The TCM does not allow a pressure to be selected that may cause damage to the transmission. If the requested pressure is less than allowed by the TCM, the message "Requested pressure for the Line PC Solenoid is too low" appears on the scan tool display.
- Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
PC Solenoid 2 Command The TCM commands the pressure control solenoid in order to apply or release the clutches. When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. When the engine is running, the following control limits apply: The transmission range must be in Park or Neutral. If the transmission range is not Park or Neutral, the message "Engine running and transmission range is not Park/Neutral" appears on the scan tool display. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
- The TCM commands the pressure control solenoid in order to apply or release the clutches.
- When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM.
- The transmission range must be in Park or Neutral. If the transmission range is not Park or Neutral, the message "Engine running and transmission range is not Park/Neutral" appears on the scan tool display.
- The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM.
PC Solenoid 3 Command
PC Solenoid 4 Command
PC Solenoid 5 Command

Service Clean Procedure The scan tool is used to start and stop the transmission cleaning procedure algorithm. The following control limits apply: The engine must be running. The message “Engine not Running” will appear on the scan tool if this control is attempted without the engine running. There cannot be active transmission DTCs. The message “Transmission Fault present” will appear on the scan tool if this control is attempted with transmission DTCs active. The transmission range must be Park or Neutral. The message “Transmission not in PARK or NEUTRAL” will appear on the scan tool if this control is attempted with the transmission in any range other than Park or Neutral. The vehicle speed cannot exceed 8 km/h (5 mph). The message “Vehicle Speed too high” will appear on the scan tool if this control is attempted with a vehicle speed greater than 8 km/h (5 mph). The engine speed cannot exceed 2500 RPM. The message “Engine Speed too high” will appear on the scan tool if this control is attempted with an engine speed greater than 2500 RPM. The transmission oil temperature must be at a normal operating temperature. The message “Transmission oil temperature out of range” will appear on the scan tool if this control is attempted without a transmission oil temperature between 70–110°C (158–230°F).
- The scan tool is used to start and stop the transmission cleaning procedure algorithm.
- The following control limits apply:
- The engine must be running. The message “Engine not Running” will appear on the scan tool if this control is attempted without the engine running.
- There cannot be active transmission DTCs. The message “Transmission Fault present” will appear on the scan tool if this control is attempted with transmission DTCs active.
- The transmission range must be Park or Neutral. The message “Transmission not in PARK or NEUTRAL” will appear on the scan tool if this control is attempted with the transmission in any range other than Park or Neutral.
- The vehicle speed cannot exceed 8 km/h (5 mph). The message “Vehicle Speed too high” will appear on the scan tool if this control is attempted with a vehicle speed greater than 8 km/h (5 mph).
- The engine speed cannot exceed 2500 RPM. The message “Engine Speed too high” will appear on the scan tool if this control is attempted with an engine speed greater than 2500 RPM.
- The transmission oil temperature must be at a normal operating temperature. The message “Transmission oil temperature out of range” will appear on the scan tool if this control is attempted without a transmission oil temperature between 70–110°C (158–230°F).
Reset Transmission Adapts The scan tool is used to start and stop the transmission Fast Learn Adapt algorithm. The following control limits apply: The engine must be running. The message “Engine not Running” will appear on the scan tool if this control is attempted without the engine running. There cannot be active transmission DTCs. The message “Transmission Fault present” will appear on the scan tool if this control is attempted with transmission DTCs active.
- The scan tool is used to start and stop the transmission Fast Learn Adapt algorithm.
Shift Solenoid 1 The TCM commands Shift Solenoid 1 and Shift Solenoid 2 ON and OFF. When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. When the engine is running, the following control limits apply: The transmission range must be in Park or Neutral. If the transmission range is not Park or Neutral, the message "Engine running and transmission range is not Park/Neutral" appears on the scan tool display. The solenoid remains ON until commanded OFF, and vice versa. When the output control is exited, the solenoid state is determined by the TCM. Transmission range DTCs must not be active. If a transmission range DTC is active, the message "Engine running with transmission DTC present" appears on the scan tool display.
- The TCM commands Shift Solenoid 1 and Shift Solenoid 2 ON and OFF.
Shift Solenoid 2
TCC PC Solenoid Command The transmission control module (TCM) commands the torque converter clutch pressure control (TCC PC) solenoid pressure in order to apply and release the TCC. When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF and vice versa. When the engine is running, the following control limits apply: If the transmission range is Park, and the transmission is in hot mode, the TCC PC solenoid may not be commanded OFF. If the solenoid is requested OFF, the message "TCC OFF command disabled in Hot Mode" appears on the scan tool display. The TCC PC solenoid may not be commanded OFF for more than a calibrated amount of time. If the solenoid is commanded OFF, for a certain amount of time, the message "TCC OFF time has been exceeded" appears on the scan tool display.
- The transmission control module (TCM) commands the torque converter clutch pressure control (TCC PC) solenoid pressure in order to apply and release the TCC.
- When the ignition is ON, and the engine is OFF, there are no limits to this control. The solenoid remains ON until commanded OFF and vice versa.
- If the transmission range is Park, and the transmission is in hot mode, the TCC PC solenoid may not be commanded OFF. If the solenoid is requested OFF, the message "TCC OFF command disabled in Hot Mode" appears on

the scan tool display.
- The TCC PC solenoid may not be commanded OFF for more than a calibrated amount of time. If the solenoid is commanded OFF, for a certain amount of time, the message "TCC OFF time has been exceeded" appears on the scan tool display.