

**2005 4T45E** when used with: 2.0L (LSJ), 2.2L (L61)  
in these vehicles: Cobalt, ION

**TRANSMISSION DIAGNOSTIC PARAMETERS**

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SENSED PARAMETER	FAULT CODE	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PROMARY MALF DETECTION PARAMETERS	SECONDARY PARAMETERS AND CONDITIONS	MONITORING TIME & DTC TYPE
Transmission Control Module Read Only Memory	<b>P0601</b>	EPROM/Flash memory corruption (Incorrect program/calibrations checksum)	ROM fail count $\geq 5$	None	Immediate Type A
Transmission Control Module Not Programmed	<b>P0602</b>	Non-programmed TCM (calibrations)	KbCOND_NoStartCal = TRUE	None	Immediate Type A
Transmission Control Module Long-Term Memory Reset	<b>P0603</b>	Wrong copy of Non-volatile Memory to RAM	Non-volatile memory (static or dynamic) checksum failure	None	Immediate Type A
Transmission Control Module Random Access Memory	<b>P0604</b>	RAM failure	RAM read/write failure (single word) RAM fail count $\geq 5$	None	Immediate Type A
Transmission Fluid Temperature Sensor Performance	<b>P0711</b>	Constant TFT for period of time in which a change is expected	<u>Fail Case 1</u> $\Delta TFT < 2^\circ C$ . TCC Slip $\geq 120$ RPM for 300 sec cumul. $-39^\circ C \leq TFT \text{ at startup} \leq 20^\circ C$ .  <u>Fail Case 2</u> $\Delta TFT < 2^\circ C$ . $129^\circ C \leq TFT \text{ at startup} \leq 149^\circ C$ .	No ETC Faults Active P0711 has not passed this key on No P0716, P0717, P0722, P0723 DTCs $8.0V \leq \text{Ignition Voltage} \leq 18.0V$ $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec Veh Spd $\geq 8.0$ kph for 300 sec cumul. $-39^\circ C \leq TFT \leq 149^\circ C$ ECT $\geq 70^\circ C$ . $\Delta ECT \geq 55^\circ C$ . since start-up	<u>Fail Cases 1, 2</u> 80.0 sec Type C-
Transmission Fluid Temperature Sensor Circuit Low Voltage	<b>P0712</b>	Continuous Short-to-Ground in Trans Fluid Temperature sensor or TFT signal circuit	Trans Temp Sensor $\leq 43.19$ ohm Trans Temp $> 150C$	$8V \leq \text{Ignition Voltage} \leq 18V$ for 5 sec $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec	10.0 sec Type C-

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Transmission Fluid Temperature Sensor Circuit High Voltage	<b>P0713</b>	Continuous Open or Short to Voltage in Transmission Fluid Temperature sensor or TFT signal circuit	Trans Temp Sensor $\geq 171862$ ohm Trans Temp $< -40C$ (-40F)	No P0716, P0717, P0722, P0723 DTCs $500 \leq$ Engine RPM $\leq 6500$ for 5.0 sec $8.0 \leq$ Ignition Voltage $\leq 18.0$ V OSS $\geq 65.6^*$ RPM for 200 sec cumul. TCC Slip $\geq 120$ RPM for 200 sec cumul.	80.0 sec Type C-
Input Speed Sensor Performance	<b>P0716</b>	0 – 6500 RPM Unrealistically large drop in Input Speed in a very period of time that remains	Input Speed drop $\geq 1000$ RPM	No P0717, P0722, P0723, P0752, P0973, P0974 DTCs $8V \leq$ Ignition Voltage $\leq 18V$ $500 \leq$ Engine RPM $\leq 6500$ for 5 sec No TP malfunction No Engine Torque malfunction $50 \leq$ Engine Torque $\leq 1492$ N-m TPS $\geq 8.0\%$ Vehicle Speed $\geq 16.0$ kph ISS $\geq 1050$ RPM for 2.0 sec $\Delta$ ISS $\leq 500$ RPM for 2.0 sec	3.25 sec Type B
Input Speed Sensor Circuit Low Voltage	<b>P0717</b>	0 – 6500 RPM Low Input Speed with large vehicle speed	Input Speed $< 100.0$ RPM	No P0717, P0722, P0723 DTCs No Engine Torque malfunction $500 \leq$ Engine RPM $\leq 6500$ for 5 sec $8V \leq$ Ignition Voltage $\leq 18V$ Vehicle Speed $\geq 16.0$ kph $50 \leq$ Engine Torque $\leq 1492$ N-m	4.5 sec Type B
Brake Switch Circuit Low Voltage	<b>P0719</b>	TCM brake switch input senses low voltage while decelerating	TCM indicates the Brake State is continuously OFF/Not Applied while the vehicle decelerates several times	The code has not passed this ignition cycle. $8V \leq$ Ignition Voltage $\leq 18V$ P0719 has not passed this key on No vehicle speed faults The vehicle decelerates in the following manner: Vehicle Speed $> 32$ kph for 6.0 sec Then $32$ kph $\geq$ Vehicle Speed $\geq 8$ kph for 6 sec Then Vehicle Speed $< 8$ kph for 2 sec	8 deceleration sequences are performed while the brake is sensed as being continuously OFF/Not Applied. Type C-

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Output Speed Sensor Circuit Low Voltage	P0722	0 - 6500 RPM Low vehicle speed with large engine speed in Drive range	<u>Drive</u> $50 \leq \text{Engine Torque} \leq 1492 \text{ N-m}$ $\text{Output Speed} \leq 65.6^* \text{ RPM}$  <u>Park/Neutral</u> $1492 \leq \text{Engine Torque} \leq 1492 \text{ N-m}$	No, P0716, P0717, P0723 No TPS malfunction No Engine Torque malfunction $8\text{V} \leq \text{Ignition Voltage} \leq 18\text{V}$ $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec Range $\neq$ P/N TCC Slip $\geq -20 \text{ RPM}$ Trans Temp $\geq -40^\circ \text{ C.}$ $1500 \text{ RPM} \leq \text{Input Speed} \leq 5000 \text{ RPM}$ TPS $\geq 8.0\%$	4.5 sec  Type B
Output Speed Sensor Circuit Intermittent	P0723	0 - 6500 RPM Loss of vehicle speed when vehicle is moving	Drop in Output Speed $> 393.5^* \text{ RPM}$ in any Drive range	No P0716, P0717, P0974 DTC $8\text{V} \leq \text{Ignition Voltage} \leq 18\text{V}$ $500 \leq \text{Engine RPM} \geq 6500$ for 5 sec Range $\neq$ P/N $50 \text{ Nm} \leq \text{Engine Torque} \leq 1492 \text{ Nm}$ Time since last range change $\geq 6.0 \text{ sec}$ $+\Delta\text{VSS, loop-to-loop,} \leq 164^* \text{ RPM}$ for 2.0 sec $\Delta\text{ISS} \leq 500 \text{ RPM}$ for 2.0 sec Output Speed $\geq 327.9^* \text{ RPM}$ for 2.0 sec	3.25 sec  Type B
Brake Switch Circuit High Voltage	P0724	TCM brake switch input senses high voltage since start-up while accelerating	TCM indicates the Brake State is continuously ON/Applied since start-up while the vehicle accelerates several times	The code has not passed this ignition cycle.  $8\text{V} \leq \text{Ignition Voltage} \leq 18\text{V}$ for 5 sec DTC has not ran this key ON. No vehicle speed faults The vehicle accelerates in the following manner: Vehicle Speed $< 8 \text{ kph}$ for 2.0 sec Then $8 \text{ kph} \leq \text{Vehicle Speed} \leq 32 \text{ kph}$ for 6 sec Then Vehicle Speed $> 32 \text{ kph}$ for 6 sec	The Brake is continuously on for 900 seconds  8 acceleration sequences are performed while the brake is sensed as being continuously ON/Applied.  Type C-

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Torque Converter Clutch System - Stuck Off	<b>P0741</b>	High TCC slip with TCC commanded on	TCC slip $\geq$ 200 RPM  Count = 1	No P0716, P0717, P0722, P0723, P0742, P0842, P0843 No TPS malfunction No Engine Torque and Speed malfunctions 8V $\leq$ Ignition Voltage $\leq$ 18V 500 $\leq$ Engine RPM $\leq$ 6500 for 5.0 sec 50 $\leq$ Engine Torque $\leq$ 1492 N-m 8.0% $\leq$ TPS $\leq$ 90% 20° C. $\leq$ Trans Temp $\leq$ 130° C. TCC Capacity $\geq$ 55% for 5.0 sec Commanded Gear > 1 TCC Mode = On or Locked On	5 sec  Type B
Torque Converter Clutch System - Stuck On	<b>P0742</b>	Low TCC slip with TCC commanded off	-20 rpm $\leq$ TCC Slip Speed $\leq$ 60 rpm  Count = 4	No P0716, P0717, P0722, P0723, P0741 No TPS malfunction No Engine Torque and Speed malfunctions 8V $\leq$ Ignition Voltage $\leq$ 18V 500 $\leq$ Engine RPM $\leq$ 6500 for 5.0 sec TCC commanded OFF 50 $\leq$ Engine Torque $\leq$ 1492 N-m 20° C. $\leq$ Trans Temp $\leq$ 130° C. 8% $\leq$ TPS $\leq$ 90% 16 kph $\leq$ VSS $\leq$ 511 kph	4 sec  Type B
1-2 Shift Solenoid Valve Performance - No First or Fourth Gear	<b>P0751</b>	2-2-3-3 shift pattern	<u>Fail Case 1</u> Commanded 1st 1.5446 < Ratio < 1.7072  <u>Fail Case 2</u> Commanded 4th 0.95 < Ratio < 1.05  Count = 2	No P0716, P0717, P0722, P0723, P0742, P0973, P0974, P0976, P0977, or TPS DTCs (see below) No Engine Torque malfunction 500 $\leq$ Engine RPM $\leq$ 6500 for 5.0 sec 8V $\leq$ Ignition Voltage $\leq$ 18V TPS > 8.0% 150 RPM $\geq$ ISS $\geq$ 150 RPM 20° C. < Trans Temp < 130° C. 0.30 sec. after gear change 150 $\leq$ Input Speed $\leq$ 6000 RPM 50 $\leq$ Engine Torque $\leq$ 1492 N-m Output Speed $\leq$ 65.6* RPM	<u>Fail Case 1</u> 1.0 sec  <u>Fail Case 2</u> 3.0 sec  Type B

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1-2 Shift Solenoid Valve Performance - No Second or Third Gear	<b>P0752</b>	1-1-4-4 shift pattern	<p><u>Fail Case 3</u> Commanded 2nd 2.8120 &lt; Ratio &lt; 3.1080</p> <p><u>Fail Case 4</u> Commanded 3<sup>rd</sup> 0.6469 &lt; Ratio &lt; 0.7150</p> <p>Count = 2</p>	See P0751	<p><u>Fail Case 3</u> 2.0 sec</p> <p><u>Fail Case 4</u> 2.0 sec</p> <p>Type B</p>
2-3 Shift Solenoid Valve Performance - No First or Second Gear	<b>P0756</b>	4-3-3-4 shift pattern	<p><u>Fail Case 5</u> -20 ≤ TCC Slip ≤ 8191 RPM VSS ≥ 65.6* RPM Commanded 1st 0.65 ≤ Ratio ≤ 1.87</p> <p><u>Fail Case 6</u> Commanded 2nd 0.95 ≤ Ratio ≤ 1.05</p> <p>Count = 1</p>	See P0751	<p><u>Fail Case 5</u> 2.0 sec</p> <p><u>Fail Case 6</u> 1.0 sec</p> <p>Type A</p>
2-3 Shift Solenoid Valve Performance - No Third or Fourth Gear	<b>P0757</b>	1-2-2-1 shift pattern	<p><u>Fail Case 7</u> 40 ≤ Engine Torque ≤ 1492 N-m Commanded 3rd 1.5446 &lt; Ratio &lt; 1.7073</p> <p><u>Fail Case 8</u> 0 ≤ Engine Torque ≤ 1492 N-m Commanded 4<sup>th</sup> 1.5446 &lt; Ratio &lt; 3.1080</p> <p>Count = 1</p>	See P0751	<p><u>Fail Case 7</u> 2.0 sec</p> <p><u>Fail Case 8</u> 2.0 sec</p> <p>Type A</p>
Torque Converter Clutch Release Switch Circuit Low Voltage	<b>P0842</b>	Closed Release Switch, indicating TCC is applied when TCM is commanding TCC off and TCC slip shows TCC is OFF.	<p>Release switch closed (grounding) for 6.0 sec</p> <p>Count = 2</p>	<p>No P0716, P0717, P0741, P0742 P2764, P2763 DTCs No Engine Speed or Torque Malfunctions 500 ≤ Engine RPM ≤ 6500 for 5.0 sec TCC commanded OFF 100 RPM &lt; Slip Speed 50 &lt; Engine Torque &lt; 1492 N-m 20° C. &lt; Trans Temp &lt; 130° C. 8 kph &lt; VSS &lt; 100 kph</p>	<p>6.0 sec</p> <p>Type B</p>

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Torque Converter Clutch Release Switch Circuit High Voltage	<b>P0843</b>	Open Release Switch, indicating TCC not applied when TCM is commanding TCC ON and TCC slip shows TCC is locked	Release switch open for 6.0 sec  Count = 2	No P0716, P0717, P0741, P0742 P2764, P2763 DTCs No Engine Speed Malfunction 500 ≤ Engine RPM ≤ 6500 for 5.0 sec TCC commanded ON, or LockON -10 < Slip < 60 RPM 50 < Engine Torque < 1492 N-m 20° C. < Trans Temp < 130° C. 103 < TCC Pressure < 827 kPa	6.0 sec  Type B
1-2 Shift Solenoid Control Circuit Low Voltage	<b>P0973</b>	0 – 12 V Continuous Short-to-Ground OR Open in Shift Solenoid A or SSA circuit (ODM)	SSA ODM feedback circuit state ≠ PCM commanded state	Ignition ON 8.0 ≤ Ignition Voltage ≤ 18.0 V	Fail count = 44 out of 50 (Time ≈ 4.4 sec)  Type B
1-2 Shift Solenoid Control Circuit High Voltage	<b>P0974</b>	0 – 12 V Continuous Short-to-Power in Shift Solenoid A or SSA circuit (ODM)	SSA ODM feedback circuit state ≠ PCM commanded state	Ignition ON 8.0 ≤ Ignition Voltage ≤ 18.0 V	Fail count = 44 out of 50 (Time ≈ 4.4 sec)  Type B
2-3 Shift Solenoid Control Circuit Low Voltage	<b>P0976</b>	0 – 12 V Continuous Short-to-Ground OR Open in Shift Solenoid B or SSB circuit (ODM)	SSB ODM feedback circuit state ≠ PCM commanded state	Ignition ON 8.0 ≤ Ignition Voltage ≤ 18.0 V	Fail count = 44 out of 50 (Time ≈ 4.4 sec)  Type A
2-3 Shift Solenoid Control Circuit High Voltage	<b>P0977</b>	0 – 12 V Continuous Short-to-Power in Shift Solenoid B or SSB circuit (ODM)	SSB ODM feedback circuit state ≠ PCM commanded state	Ignition ON 8.0 ≤ Ignition Voltage ≤ 18.0 V	Fail count = 44 out of 50 (Time ≈ 4.4 sec)  Type A
Transmission Control Module Long Term Memory Performance	<b>P1621</b>	NVM write error at key-down	TCM Non-Volatile Memory Incorrect flag = 1	8.0 ≤ Ignition Voltage ≤ 18.0 V Ignition ON	Immediate  Type A
Transmission Fluid Pressure Position Switch Circuit	<b>P1810</b>	0 – 12 V Invalid state of Pressure Switch Assembly circuit	Illegal PSA range	500 ≤ Engine RPM ≤ 6500 for 5.0 sec	60.0 sec  Type B

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Transmission Fluid Pressure Valve Position Switch Indicates Park/Neutral with Drive Ratio	<b>P1816</b>	0 – 12 V Drive Ratio with P/N Range	PSA = P/N $2.7528 \leq \text{Ratio} \leq 3.1672$ $1.5122 \leq \text{Ratio} \leq 1.7397$ $0.93 \leq \text{Ratio} \leq 1.07$ $0.6333 \leq \text{Ratio} \leq 0.7296$	No P0716, P0717, P0722, P0723, P0751, P0752, P0756, P0757 P0973, P0974, P0976, P0977, or TPS DTCs (see below) $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec Output Speed $\geq 82^*$ RPM $8\% \leq \text{TPS} \leq 90.0\%$ $50 \leq \text{Engine Torque} \leq 1492$ N-m	6.25 sec Continuous Type B
Transmission Fluid Pressure Valve Position Switch Indicates Drive without Drive Ratio	<b>P1818</b>	0 – 12 V Reverse Ratio with Park/Neutral OR Drive Range	PSA = P/N, or Drive And $1.9930 \leq \text{Ratio} \leq 2.2928$	No P0716, P0717, P0722, P0723, P0751, P0752, P0756, P0757, P0973, P0974, P0976, P0977 No TPS Malfunction No Engine Torque Malfunction $8V \leq \text{Ignition Voltage} \leq 18V$ $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec Output Speed $\geq 50^*$ RPM TPS $\geq 3\%$ $20 \leq \text{Engine Torque} \leq 1492$ N-m	2.75 sec Continuous Type B
Ignition 1 Switch Circuit Low Voltage  Note: Diagnostic added in s/w 7.8.12 as running production change	<b>P2534</b>	Continuous Open/Short-to-Ground in TCM Ignition 1 Switch circuit	Every 25 msec, the FAIL counter is incremented if an open or a short to ground is detected	Engine running	Fail Count = 200 out of 215 (Time $\approx$ 5 sec) Continuous Type A
Torque Converter Clutch Pressure Control Solenoid Control Circuit High Voltage	<b>P2763</b>	Continuous Short-to-Voltage in TCC PWM circuit	Every 100 msec, the FAIL counter is incremented if a short to voltage is detected	Ignition ON $8V \leq \text{Ignition Voltage} \leq 18V$ $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec TCC Commanded ON	Fail Count = 44 out of 50 (Time $\approx$ 4.4 sec) Continuous Type B
Torque Converter Clutch Pressure Control Solenoid Control Circuit Low Voltage	<b>P2764</b>	Continuous Open/Short-to-Ground in TCC PWM circuit or TCC PWM solenoid	Every 100 msec, the FAIL counter is incremented if an open or a short to ground is detected	Ignition ON $8V \leq \text{Ignition Voltage} \leq 18V$ $500 \leq \text{Engine RPM} \leq 6500$ for 5.0 sec	Fail Count = 44 out of 50 (Time $\approx$ 4.4 sec) Continuous Type B

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Controller Area Network Bus Communication Error	<b>U2100</b>	TCM cannot communicate on the CAN Bus	GetCNDD_b_BusOffSt() = TRUE	Ignition ON 8V ≤ Ignition Voltage ≤ 18V for 5 seconds	1.0 sec Type B
Lost Communications with Engine Control System	<b>U2105</b>	Communication between TCM & Engine Control System Lost	CAN Bus ECM Error flag = 1 1.0 Sec.	Ignition ON 8V ≤ Ignition Voltage ≤ 18V for 5 seconds	1.0 sec Type B