

2004 4L60-E transmission when used with 4.2L (LL8) in-line 6 cylinder truck engine

TRANSMISSION DIAGNOSTIC PARAMETERS

2004trans2_4L60E.doc

SENSED PARAMETER	FAULT CODE	SENSOR SIGNAL TYPE	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PRIMARY MALF DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS AND CONDITIONS	FAIL MONITORING TIME LENGTH AND FREQUENCY OF CHECK	PRIMARY PASS DETECTION PARAMETERS	PASS SECONDARY MONITORING PARAMETERS AND CONDITIONS	PASS MONITORING TIME LENGTH AND FREQUENCY OF CHECK	MONITORING METHOD	ACTIONS	FAULT CODE STORAGE AND MIL ILLUMINATION
Vehicle Speed Sensor - Low input	P0502	Analog	0 RPM to 6000 RPM This DTC detects a low vehicle speed when the vehicle has a large engine speed in a drive gear range.	Output Speed < 150 rpm	- Gear Range is not Park/Neutral - No TPS high or low DTC's set - No Map Sensor DTC's set - No PSA DTC set - Vacuum 25 to 60 KPA - Throttle Position 20 to 50% - Engine Speed 3200 to 4775 RPM	3 seconds Continuous	Output Speed > 250 rpm	No VSS DTC's set	2 seconds Continuous	AC Voltage generating Vehicle Speed Sensor	- Freeze Adapts - Max. Line Pressure - Default to 2nd gear. - TCC Off FATKO	DTC Type B
Vehicle Speed Sensor - Intermittent	P0503	Analog	0 RPM to 6000 RPM This DTC detects an unrealistic large drop in vehicle speed.	In P/N : Output Speed drop > 8192 RPM Not P/N : Output Speed drop >1300 RPM	- Time since last Gear Range Change > 6 Seconds - Engine Speed >450 rpm - No Output Speed rise > 600 rpm within 2 seconds - No PSA DTC set - Time since 4WDL State Change > 6 seconds	In park or neutral 409 seconds Not in park or neutral 3 seconds	Output Speed drop < 500 rpm for 2 sec and output speed is > 500 rpm	- Time since last Gear Range Change > 6 Seconds - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - No output speed rise > 600 rpm within 2 seconds - No PSA DTC set - Time since 4WDL State Change > 6 seconds	2 seconds Continuous	AC Voltage generating Vehicle Speed Sensor	- Freeze shift and ECCC Adapts - Softland to 2nd gear - Max line pressure - TCC Off - Inhibit 4th if hot FATKO	DTC Type B
Trans Fluid Temp Sensor Circuit - Performance Test	P0711	Analog	.24V to 5.0V The DTC detects an unrealistically large change in transmission temperature or a value which remains constant for a period of time in which a measurable amount of change is expected.	1) Failure 1 is true for ≥ 409 seconds 2) Failure 2 happens ≥ 14 times in 7 sec.	- System Voltage: 10 and 18 volts - No VSS DTC's - Raw TTS counts: 10 to 251 - No DTC 1870 - Trans Temp at startup: -40 C to 21 C - Engine Running ≥ 409 sec. - Vehicle Speed ≥ 5 mph for ≥ 409 sec. cumulative this ignition cycle. - Torque Converter Slip ≥ 120 rpm for ≥ 409 sec. cumulative this ignition cycle. - Coolant Temp ≥ 70 C and has changed by ≥ 50 C since startup. 1) Trans Temp has not changed ≥ 2.25 C (absolute value) since startup 2) Trans Temp changes ≥ 20 C (absolute value) in 200 msec.	1) 409 seconds 2) 7 seconds continuous	1) Trans Temp has changed ≥ 3.0 C since startup during an 11.0 sec sample. 2) Trans Temp does not change ≥ 20 C in 200 msec.	Raw TTS counts: 10 to 251	1) 11.0 seconds	Thermister	Default Trans Temp depending on coolant temp, engine run timer and MAT at startup. Freeze shift and ECCC Adapts FATKO	DTC Type C
Trans Fluid Temp Sensor Circuit - Low input (high temp)	P0712	Analog	.24V to 5.0V The DTC detects a continuous short to ground in the TTS signal circuit or the TTS sensor	Raw TTS count < 10	- System Voltage: 10 to 18 volts - Ignition "on"	10 seconds Continuous	Raw TTS counts > 10	None	10 seconds Continuous	Thermister	Default Trans Temp depending on coolant temp, engine run timer and MAT at startup Freeze shift and ECCC Adapts FA	DTC Type C

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Trans Fluid Temp. Sensor Circuit - High Input (Low temp)	P0713	Analog	.24V to 5.0V The DTC detects a continuous open or short to high in the TTS signal circuit or the TTS sensor	Raw TTS counts > 250	- System Voltage: 10 to 18 volts - Ignition "on"	400 seconds Continuous	Raw TTS counts < 250	None	400 seconds Continuous	Thermister	Default Trans Temp depending on coolant temp, engine run timer and MAT at startup Freeze shift and ECCC Adapts FA	DTC Type C
Brake Switch Circuit Low Input "Brake ON"	P0719	Digital	.0V to 12.0 V This DTC detects an open brake switch during accelerations.	Accel counts >= 8 and brake is ON for 900 seconds without going off for 2 seconds.	- No VSS DTC's - Brake Switch Off is not passed - Increment Accel counter when the Brake Switch is On and the following conditions are met: 1. Vehicle Speed <5 MPH, then, 2. Vehicle Speed: 5 to 20 MPH for 4 seconds, then, 3. Vehicle Speed > 20 MPH for 6 seconds.	8 test failures on the current ignition cycle. Continuous	Pass Counts >= 1	Increment pass counter when the Brake Switch is off for > 2 seconds.	Continuous	Switch	If pass case (brake switch off) has not been true this ignition cycle and the following conditions are met: 1.TPS > 10% VSS > 40 mph, then, 2.TPS > 5% VSS > 35 mph, then disregard brake switch for TCC scheduling. Freeze ECCC adapts FA	DTC Type C
Brake Switch Circuit High Input "Brake OFF"	P0724	Digital	.0 V to 12.0 V This DTC detects a closed brake switch during de accelerations	Decel counts >= 8 and brake has not been ON for > 2 seconds	- No VSS DTC's - Increment Decel counter when the Brake Switch is OFF and the following conditions occur: 1. Vehicle Speed > 20 MPH for 6 seconds, then, 2. Vehicle Speed: 5 to 20 MPH for 4 seconds, then, 3. Vehicle Speed < 5 MPH	8 test failures on the current ignition cycle Continuous	Pass counts >= 1	Increment pass counter when Brake Switch is On > 2 sec	Continuous	Switch	Freeze ECCC adapts FA	DTC Type C
TCC Enable Solenoid Electrical	P0740	Analog	0V to 12V This DTC detects a continuous open or short to ground in the TCC circuit or the TCC solenoid	Fail Counter >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Pass Counter has incremented in each solenoid state and is >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	TCC Solenoid	- Freeze shift and ECCC Adapts - TCC output Off - Inhibit 4th gear if hot mode FATKO	DTC Type B

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TCC System Stuck OFF	P0741	Software	This DTC detects high torque converter slip when the TCC is commanded on.	TCC slip > 130 rpm for 20 seconds	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D2 or D3 or D4 - No PSA DTC's set - No TPS High or Low DTC's - No VSS DTC's - No TCC solenoid electrical DTC's - No TCC Performance P0742 TCC Stuck ON DTC set - No range change in last 6 sec - TPS: 20% to 99% - Trans temp.: 20 C to 150 C - Gear ratio: 0.89 to 1.02 - TCC commanded on for 5 sec - TCC duty cycle >= 40% 	TCC must be commanded off for at least 0.1 seconds between on cycles	TCC slip < 50 rpm for 5 seconds	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D3 - No PSA DTC's set - No TPS High or Low DTC's - No VSS DTC's - No TCC solenoid electrical DTC's - No TCC Performance P0742 TCC Stuck ON DTC set - No range change in last 6 sec - TPS: 20% to 99% - Trans temp.: 20 C to 150 C - Gear ratio: 0.89 to 1.02 - TCC commanded on for 5 sec - TCC duty cycle >= 40% 	TCC must be commanded off for at least 0.1 seconds between on cycles	1X Engine Speed Signal and the Vehicle Speed Sensor	<ul style="list-style-type: none"> - Freeze shift and ECCC adapts - TCC Off - Inhibit 4th if hot mode - Max pressure 	DTC Type B
TCC System Stuck ON	P0742	Software	This DTC detects low torque converter slip when the TCC is commanded off.	TCC Slip: -20 to +20 RPM Fail Counter >= 2	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 6 seconds and not in fuel cutoff - No Range change within 5 sec. - No TP high or low sensor DTC's - No VSS DTC's - No TCC Enable Sol. DTC's - No TCC Control Sol. DTC's - No PSA DTC set - No Engine Torque Default - Eng Torque: 50 to 400 ft-lbs - Vacuum: 0 to 105 kPa - Commanded Gear is not 1st - Gear Range is D4 - Trans temp.: 20 C to 130 C - Throttle Position: 17% to 45% - TCC is commanded off - Engine Speed: 1000 to 3000 rpm - Speed Ratio: 0.64 to 1.35 - Vehicle Speed: 15 to 50 mph 	5 seconds Continuous	TCC Slip: 100 to 2000 RPM	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - No Range change within 6 sec. - No TP high or low sensor DTC's - No VSS DTC's - No TCC Enable Sol. DTC's - No TCC Control Sol. DTC's - No PSA DTC set - No Engine Torque Default - Eng Torque: 50 to 400 ft-lbs - Vacuum: 0 to 105 kPa - Commanded Gear is not 1st - Gear Range is D4 - Trans temp.: 20 C to 130 C - Throttle Position: 17% to 45% - TCC is commanded off - Engine Speed: 1000 to 3000 rpm - Speed Ratio: 0.64 to 1.35 - Vehicle Speed: 15 to 50 mph 	2 seconds Continuous	1X Engine Speed Signal and the Vehicle Speed Sensor	<ul style="list-style-type: none"> - Freeze shift and ECCC Adapts - TCC output off - Inhibit 4th gear if hot mode 	DTC Type B
Pressure Control Solenoid Ckt Electrical	P0748	Analog	0V to 12V This DTC detects a continuous open or short to ground in the PCS circuit or the PCS sensor	PCS DC reaches its high or low limit	<ul style="list-style-type: none"> - No Sys Volt DTC's - Disable the diagnostic if system voltage falls below 10.5 volts at low temp (-40 C) or 11.5 volts at high temp (150 C) for 0.2seconds. The diagnostic will be enabled again when system voltage increases above 11 volts at low temp (-40 C) or 12 volts at high temp (150 C) for 0.2 seconds. Note: The disable and enable voltage values are determined by linear interpolation when the transmission fluid temperature is between the low and high values. 	Continuous	PCS DC is not at its high or low limit	No Sys Volt DTC's	Continuous	Pressure Control Solenoid	<ul style="list-style-type: none"> - Pressure Control Solenoid Off - Freeze shift and ECCC Adapts 	DTC Type C

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Shift Solenoid A Performance	P0752	Analog	This DTC detects abnormal shift pattern Stuck ON: 1-1-4-4 pattern	Fail Counter >= 2 The fail counter is incremented when the following fail cases are true: Stuck ON: 1 and 2	General -Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff -Gear range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm -No TP high or low DTC's -No VSS low or intermittent DTC's -No Solenoid electrical DTC's -No DTC 742 -No PSA DTC set -Trans Temp.: 20 C to 130 C Fail Case 1 - 2nd gear commanded >= 1.0 second - TPS >= 10% - Engine torque: 25 to 400 ft lbs - Modeled speed ratio >= 0.5 - Gear ratio 3.0 to 3.3 Fail Case 2 - 3rd gear commanded >= 1.0 second - TPS >= 10% - Engine torque: 50 to 400 ft lbs - Modeled speed ratio >= 0.5 - Gear ratio 0.65 to 0.9	Continuous Fail Case 1 2.0 seconds Fail Case 2 3.0 seconds	Pass the diagnostic when the following test cases are true: Pass Cases 1 and 2	General -Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff -Gear range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm -No TP high or low DTC's -No VSS low or intermittent DTC's -No Solenoid electrical DTC's -No DTC 742 -No PSA DTC set -Time since last shift is >0 sec -Vehicle speed >5 mph -Trans Temp.: 20 C to 130 C Pass Case 1 - 1 second after commanded gear is 2nd - TPS >= 10% - Engine torque: 20 to 400 ft lbs - Modeled speed ratio >= 0.5 - Gear ratio 1.6 to 1.8 Pass Case 2 - 1 second after commanded gear is 3rd - TPS >= 10% - Engine torque: 50 to 400 ft lbs - Modeled speed ratio >= 0.5 - Gear ratio 0.95 to 1.2	Continuous Pass Case 1 1.0 second Pass Case 2 1.0 second	Shift Solenoid	-Freeze Adapts -D2 pressure Schedule -Inhibit commanded 3-2 downshifts if Vehicle Speed > 30 mph. Inhibit 4th gear if hot mode FATKO	DTC Type B
Shift Solenoid A Electrical	P0753	Analog	0V to 12V This DTC detects a continuous open or short to ground in the SSA circuit or the SSA solenoid	Fail Counter >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Pass Counter has incremented in each solenoid state and is >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Shift Solenoid	- Freeze shift and ECCC Adapts - D2 pressure Schedule - Inhibit commanded 3-2 downshifts if Vehicle Speed > 30 mph. - Inhibit 4th gear if hot mode - TCC off FATKO	DTC Type B

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Shift Solenoid B Performance	P0756	Software	This DTC detects abnormal shift pattern Stuck OFF: 4-3-3-4 pattern	Fail Counter >= 1 The fail counter is incremented when the following fail cases are true: Stuck OFF: 1 and 2	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm - No TPS DTC's - No VSS DTC's - No solenoid electrical DTC's - No TCC Stuck On DTC. - No PSA DTC set <p>- Trans Temp: 20 C to 130 C</p> <p>Fail Case 1</p> <ul style="list-style-type: none"> - 1st gear commanded >= 2.0 sec. - Transmission Output >= 200 rpm - Engine Torque: 50 to 400 ft lbs <p>- Throttle Position >= 10%</p> <p>- TCC Slip: -3000 to 200 rpm</p> <ul style="list-style-type: none"> - Gear ratio 0 to 1.4 <p>Fail Case 2</p> <ul style="list-style-type: none"> - 2nd gear command >= 1.0 sec - Engine Torque: 50 to 400 ft lbs <p>- Modeled Speed Ratio >= 0.5</p> <p>- Throttle Position >= 10%</p> <ul style="list-style-type: none"> - Gear ratio 0.9 to 1.2 	Continuous	Pass the diagnostic when pass cases 1 and 2 are true.	<ul style="list-style-type: none"> - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm - No TPS DTC's - No VSS DTC's - No solenoid electrical DTC's - No TCC Stuck On DTC. - No PSA DTC set <p>- Trans Temp: 20 C to 130 C</p> <p>Pass Case 1</p> <ul style="list-style-type: none"> - 1st gear commanded >= 2.0 sec. <p>- Engine Torque: 50 to 400 ft lbs</p> <p>- Modeled Speed Ratio >= 0.5</p> <p>- Throttle Position >= 10%</p> <ul style="list-style-type: none"> - Gear ratio 2.6 to 3.3 <p>Pass Case 2</p> <ul style="list-style-type: none"> - 2nd Gear commanded for >= 1.0 sec. <p>- Engine Torque: 50 to 400 ft lbs</p> <p>- Modeled Speed Ratio >= 0.5</p> <p>- Throttle Position >= 10%</p> <ul style="list-style-type: none"> - Gear ratio 1.6 to 1.8 	Continuous	Shift Solenoid	<ul style="list-style-type: none"> - Freeze Adapts - Default to 3rd gear - Max pressure - TCC Off - Inhibit 4th gear if hot mode <p>FATKO</p>	DTC Type A

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Shift Solenoid B Performance	P0757	Software	This DTC detects abnormal shift pattern Stuck ON: 1-2-2-1 pattern	Fail Counter >= 1 The fail counter is incremented when the following fail cases are true: Stuck ON: 1 and 2	- Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm - No TPS DTC's - No VSS DTC's - No solenoid electrical DTC's - No TCC Stuck On DTC. - No PSA DTC set - Trans Temp: 20 C to 130 C Fail Case 1 - 3rd gear commanded >= 1.0 sec. - Engine Torque: 50 to 400 ft lbs - modeled Speed Ratio >= 0.5 - Throttle Position >= 10% - Gear ratio 1.6 to 1.8 Fail Case 2 - 4th gear commanded >= 1.0 sec. - Engine Torque: 0 to 400 ft lbs - modeled Speed Ratio >= 0.5 - Throttle Position >= 10% - Gear ratio 1.8 to 3.3	Continuous Fail Case 1 2.0seconds Fail Case 2 2.0 seconds	Pass the diagnostic when pass cases 1 and 2 are true.	- Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff - Gear Range is D4 - Ignition voltage: 10 to 18 volts - Transfer case ratio in 4WD low: 0.9 to 1.2 - Transfer case ratio in 4WD high: 2.6 to 2.85 - Transmission output speed >= 150 rpm - No TPS DTC's - No VSS DTC's - No solenoid electrical DTC's - No TCC Stuck On DTC. - No PSA DTC set - Trans Temp: 20 C to 130 C Pass Case 1 - 3rd gear commanded >= 1.0 sec. - Engine Torque: 50 to 400 ft lbs - modeled Speed Ratio >= 0.5 - Throttle Position >= 10% - Gear ratio 0.95 to 1.2 Pass Case 2 - 4th gear commanded >= 1.0 sec. - Engine Torque: 50 to 400 ft lbs - modeled Speed Ratio >= 0.5 - Throttle Position >= 10% - Gear ratio 0.65 to 0.9	Continuous Pass Case 1 1 1.0 second Pass Case 2 2 1.0 second	Shift Solenoid	- Freeze Adapts - Default to 3rd gear - Max pressure - TCC Off - Inhibit 4th gear if hot mode FATKO	DTC Type A
Shift Solenoid B Electrical	P0758	Analog	0V to 12V This DTC detects a continuous open or short to ground in the SSB circuit or the SSB solenoid	Fail Counter >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Pass Counter has incremented in each solenoid state and is >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds not in fuel cutoff	Continuous	Shift Solenoid	- Freeze shift and ECCC Adapts - Default to 3rd - Max pressure - TCC Off - Inhibit 4th gear if hot mode FATKO	DTC Type A
3-2 Downshift Solenoid Electrical	P0785	Analog	0V to 12V This DTC detects a continuous open or short to ground in the D32 solenoid circuit or the D32 solenoid	Fail Counter >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Pass Counter has incremented in each solenoid state and is >43 Counts out of 50 Total Counts	- System Voltage: 10 to 18 volts - Engine Speed > 450 rpm for 5 seconds and not in fuel cutoff	Continuous	Shift Solenoid	- Freeze shift and ECCC Adapts - Max pressure - Inhibit 4th if hot - TCC Off - Soft land to 3rd FATKO	DTC Type B

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TECH 2 Override Function

Module: X_OVERRIDES

Calibrations:

- Max speed for commanded 2-1 downshift: 30 mph
- Max speed for commanded 3-2 downshift: 60 mph
- Max engine speed to allow force motor commands: 1500 rpm
- Max force motor current command: 1.1 amps
- Min force motor current command: 0.1 amp
- Max engine speed to command any shift: 5500 rpm
- Max vehicle speed to command any shift: 100 mph
- Max time to command TCC OFF: 60 seconds