

DIAGNOSIS AND TESTING

DIAGNOSTIC STRATEGY

Troubleshooting an electronically controlled automatic transmission is simplified by using the proven method of diagnosis. One of the most important things to remember is that there is a definite procedure to follow.

NOTE: Do not take short cuts or assume that critical checks or adjustments have already been made.

Follow the procedures as written to avoid missing critical components or steps.

To correctly diagnose a concern, have the following publications available:

- **INTRODUCTION - GASOLINE MODELS**
- On-Line Automotive Service Information System (OASIS)
- TSBs
- **SYSTEM WIRING DIAGRAMS** (Expedition), **SYSTEM WIRING DIAGRAMS** (Expedition EL), **SYSTEM WIRING DIAGRAMS** (Navigator) or **SYSTEM WIRING DIAGRAMS** (Navigator L)

These publications provide the information required when diagnosing transmission concerns.

Use the Diagnostic Flow Chart as a guide and follow the steps as indicated.

Preliminary Inspection

- Know and understand the customer concern.
- Verify the concern by operating the vehicle.
- Check the transmission fluid level and condition.
- Check for non-factory add-on items.
- Check selector lever cable for correct adjustment.
- Check TSBs regarding the concern.

Diagnostics


- **Carry Out On-Board Diagnostic (OBD) Key ON Engine OFF (KOEO), Key ON Engine Running (KOER).**
- Record all DTCs.
- Repair all non-transmission codes first.
- Repair all transmission codes second.
- Clear all continuous codes and attempt to repeat them.
- Repair all continuous codes.
- If only pass codes are obtained, go to **DIAGNOSIS BY SYMPTOM** for additional information and diagnosis.

Follow the diagnostic sequence to diagnose and repair the concern the first time.

DIAGNOSTIC FLOW CHART

Special Tool(s)

SPECIAL TOOL SPECIFICATION

	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
---	--

Prior to carrying out the flow test, the following items should be checked:

- Know and understand the customer concerns.
- Verify the concern by operating the vehicle.
- Check the transmission fluid level and condition.
- Check for non-factory-installed items and verify correct installation.
- Check the selector lever cable adjustments.
- Check TSBs for vehicle concerns.
- Carry out Self Test both Key ON Engine OFF (KOEO) and Key ON Engine Running (KOER).
- Record all DTCs.
- Verify the vehicles PCM and Transmission Control Module (TCM) is programmed to the latest calibration level.

DIAGNOSTIC FLOW CHART

Diagnostic Flow Chart		
1) Were any DTCs recorded?	Yes	<ul style="list-style-type: none"> • REPAIR all hard DTCs. FOLLOW the pinpoint tests. REFER to the <u>INTRODUCTION - GASOLINE MODELS</u> first, then this service information, then GO to Step 2.
	No	<ul style="list-style-type: none"> • REFER to <u>DIAGNOSIS BY SYMPTOM</u>, then GO to Step 5.
2) Are any continuous test memory codes	Yes	<ul style="list-style-type: none"> • CLEAR codes and CARRY OUT drive cycle test, then GO to

present?	No	<p>Step 3.</p> <ul style="list-style-type: none"> • GO to Step 4.
3) Did the continuous test memory codes reappear?	Yes	<ul style="list-style-type: none"> • REPAIR all continuous test memory codes. FOLLOW the pinpoint tests. REFER to the <u>INTRODUCTION - GASOLINE MODELS</u> , then this service information, then GO to Step 4.
	No	<ul style="list-style-type: none"> • GO to Step 4.
4) Is the concern repaired?	Yes	<ul style="list-style-type: none"> • CARRY OUT the final Self Test to verify that no DTCs are present. CLEAR the DTCs.
	No	<ul style="list-style-type: none"> • REFER to <u>DIAGNOSIS BY SYMPTOM</u> to diagnose and repair the concern, then GO to Step 5.
5) Are there any electrical concerns?	Yes	<ul style="list-style-type: none"> • INSTALL the scan tool and CARRY OUT the output state control test, then GO to Step 6.
	No	<ul style="list-style-type: none"> • REFER to the hydraulic and mechanical routine to DIAGNOSE and REPAIR the concern, then GO to Step 7.
6) Was the transmission concern corrected when the scan tool was installed?	Yes	<ul style="list-style-type: none"> • REFER to the <u>INTRODUCTION - GASOLINE MODELS</u> , intermittent fault diagnosis information and use the scan tool to diagnose cause of concern in the processor, vehicle harness of external inputs (sensors or switches).
	No	<ul style="list-style-type: none"> • REFER to the hydraulic and mechanical routine to DIAGNOSE and REPAIR the concern, then GO to Step 7.
7) Is the concern repaired?	Yes	<ul style="list-style-type: none"> • CARRY OUT the final Self Test to verify that no DTCs are present. CLEAR the DTCs.
	No	<ul style="list-style-type: none"> • Concern should have been repaired. GO back through the Diagnostic Flow Chart and REVIEW other components that may have contributed to the concern. CHECK and DIAGNOSE those components. GET assistance from other sources.

PRELIMINARY INSPECTION

The following items must be checked prior to beginning the diagnostic procedures:

Know and Understand the Concern

In order to correctly diagnose a concern, first understand the customer concern or condition. Customer contact may be required in order to begin to verify the concern. Understand the conditions, including when the concern occurs. For example:

- Hot or cold vehicle temperature
- Hot or cold ambient temperature
- Vehicle driving conditions
- Vehicle loaded/unloaded

After understanding when and how the concern occurs, proceed to **Verification of Condition**.

Verification of Condition

This service information provides information that must be used in both determining the actual cause of customer concerns and carrying out the appropriate procedures.

The following procedures must be used when verifying customer concerns for the transmission.

Determine Customer Concern

NOTE: Some transmission conditions can cause engine concerns. An Electronic Pressure Control (EPC) short circuit can cause engine misfiring. The Torque Converter Clutch (TCC) not disengaging will stall the engine.

Determine customer concerns relative to vehicle use and dependent driving conditions, paying attention to the following items:

- Hot or cold vehicle operating temperature
- Hot or cold ambient temperature
- Type of terrain
- Vehicle loaded/unloaded
- City/highway driving
- Upshifting
- Downshifting
- Coasting
- Engagement
- Noise/vibration - check for dependencies, either engine rpm dependent, vehicle speed dependent, shift dependent, gear dependent, range dependent or temperature dependent.

Check Transmission Fluid Level and Condition

Transmission Fluid Level Check

NOTE: The vehicle should not be driven if the transmission fluid level is low as internal transmission failure could result.

NOTE: The transmission fluid fill plug is located near the exhaust system. The exhaust will be extremely hot during this procedure.

NOTE: If the vehicle has been operated for an extended period at high highway speeds, in city traffic, during hot weather or while pulling a trailer, the transmission fluid must cool down to obtain an accurate reading.

NOTE: If the transmission starts to slip, shifts slowly or shows signs of transmission fluid leaking, the transmission fluid level should be checked.

This transmission is equipped with an internal thermal bypass located in the case. This internal thermal bypass valve will shut off transmission fluid flowing to the transmission fluid cooler if the transmission fluid temperature falls below normal operating temperature. Refer to **TRANSMISSION FLUID LEVEL CHECK**.

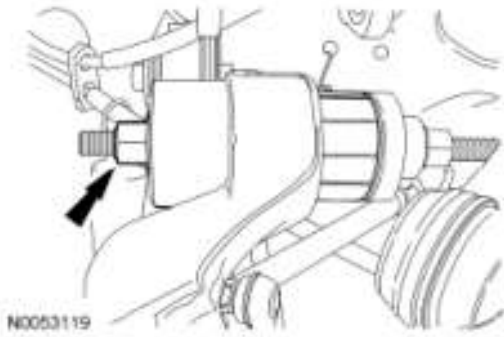


Fig. 98: Checking Transmission Fluid Level And Condition
Courtesy of FORD MOTOR CO.

High Transmission Fluid Level

NOTE: A transmission fluid level that is too high can cause the transmission fluid to become aerated due to the churning action of the rotating internal parts. This will cause erratic control pressure, foaming, loss of transmission fluid from the vent tube and possible transmission failure.

If an overfill reading is indicated, remove any excessive transmission fluid. Refer to **TRANSMISSION FLUID LEVEL CHECK**.

Low Transmission Fluid Level

A low transmission fluid level can result in poor transmission engagement, slipping or failure. This may also indicate a leak in one of the transmission seals or gaskets.

Adding Transmission Fluid

NOTE: The use of any type of transmission fluid other than specified can result in transmission failure.

NOTE: The transmission fluid fill plug is located near the exhaust system. The exhaust will be extremely hot during this procedure.

NOTE: The vehicle should not be driven if the transmission fluid level is low as internal failure could result.

NOTE: If the vehicle has been operated for an extended period at high highway speeds, in city traffic, during hot weather or while pulling a trailer, the transmission fluid must cool down to obtain an accurate reading.

Add transmission fluid using the refill procedure. Refer to **TRANSMISSION FLUID DRAIN AND REFILL**.

Transmission Fluid Condition Check

1. Check the transmission fluid level.
2. Remove the transmission fluid fill plug and transmission fluid level indicator and allow the

transmission fluid to drip onto a facial tissue and examine the stain.

3. Observe the color and the odor. The color under normal circumstances should be dark reddish, not black or have a burnt odor.
4. If evidence of solid material is found, the transmission fluid pan should be removed for further inspection.
5. If the stain is a foamy pink color, this may indicate coolant in the transmission. The engine cooling system should also be inspected at this time.
6. If transmission fluid contamination or transmission failure is confirmed by the sediment in the bottom of the transmission fluid pan, the transmission must be disassembled and completely cleaned. This includes the torque converter and transmission fluid cooler tubes. A new auxiliary transmission fluid cooler must be installed.

Water in Transmission Fluid

To correctly repair an automatic transmission or transaxle that has had water or coolant introduced into the system, completely disassemble, clean and replace the following parts:

- All internal and external seals
- All friction material; clutches and bands
- Torque converter
- All parts with bonded seals
- All solenoids
- All transmission fluid filters

Prior to installing the transmission or transaxle, the transmission fluid cooler(s), transmission fluid cooler tubes and transmission fluid cooler hoses need to be flushed and cleaned.

SHIFT POINT ROAD TEST

Special Tool(s)

SPECIAL TOOL SPECIFICATION

	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
--	---



ST2034-A

This test verifies that the shift control system is operating correctly.

1. Bring engine and transmission up to normal operating temperature.
2. Operate vehicle with the selector lever in (D) position.
3. Apply minimum throttle and observe speeds at which upshift occurs and the torque converter engages. Refer to the **SHIFT SPEEDS** chart.
4. With the transmission in (D), move the selector lever into the manual 3 position. The transmission should downshift to 4th gear. Release the accelerator pedal; engine braking should occur.
5. Press the accelerator pedal to floor, Wide Open Throttle (WOT). Transmission should shift from 4th to 3rd, depending on vehicle speed. The Torque Converter Clutch (TCC) should disengage and then reapply.
6. With the transmission in (D) position and speed above 80 km/h (50 mph) and less than half throttle, move the selector lever from (D) position to manual 2 position and release the accelerator pedal. The transmission should downshift into 2nd gear. With the transmission remaining in the manual 2 position, move the selector lever into the manual 1 position and release the accelerator pedal. The transmission should downshift into 1st gear at speeds below approximately 45-56 km/h (28-35 mph).
7. If the transmission fails to upshift/downshift or the TCC does not apply and release, Refer to **DIAGNOSIS BY SYMPTOM**.

Shift Speeds

NOTE: Shift speed ranges are approximate for all applications. For specific applications (engine, axle ratio, tire size and application), refer to the **Automatic Transmission Specification booklet**. Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

THROTTLE POSITION

Throttle Position	Shift	Km/H	MPH
Light Throttle	1-2	13-21	8-13

Throttle Position (TP) Sensor	2-3	26-34	16-21
Voltage @ 1.25 Volts	3-4	35-43	22-27
	4-5	56-64	35-40
	5-6	71-79	44-49
Closed Throttle	6-5	56-64	35-40
	5-4	40-48	25-30
	4-3	13-21	8-13
	3-2	3-11	2-7
	2-1	2-6	1-4
Wide Open Throttle (WOT)	1-2	45-53	28-33
	2-3	87-95	54-59
	3-4	140-148	87-92

Road Test - Adaptive Drive Cycle

1. Connect the scan tool to the Data Link Connector (DLC).
2. **NOTE: Disconnecting the battery will not clear the Keep Alive Memory (KAM).**

NOTE: Do not clear the PCM KAM .

Using the scan tool, clear the Transmission Control Module (TCM) **KAM** and the adaptive table before conducting an adaptive drive cycle test.

3. Using the scan tool verify that the transmission fluid is at normal operating temperature, between 80° C-82°C (176°F-180°F). If the transmission fluid is not at operating temperature, drive the vehicle approximately 5 km (3.1 mi) to reach operating temperature.

NOTE: The transmission fluid must be at operating temperature before proceeding to this step.

4.


Drive the vehicle to perform adaptive shift strategy learn on a level road surface.

1. Accelerate from a stop with light throttle to 24 km/h (15 mph) and then release the accelerator pedal.
2. Gently brake and bring the vehicle to a stop and hold foot on the brake for 6 seconds.
3. Repeat Substeps 1 and 2 an additional 5 times.
4. Accelerate from a stop with light throttle so that the 1-2, 2-3 and 3-4 shifts occur with engine speeds between 1,700-2,000 rpm.
5. Continue accelerating until either the vehicle speed reaches 80 km/h (50 mph) or the 5-6 upshift is reached.
6. Gently brake and bring the vehicle to a stop and hold foot on the brake for 10 seconds.
7. Repeat Substeps 4 to 6 an additional 3 times.

TORQUE CONVERTER DIAGNOSIS

Special Tool(s)

SPECIAL TOOL SPECIFICATION

 <p>ST2034-A</p>	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
---	--

Prior to torque converter installation, all diagnostic procedures must be followed. This is to prevent the unnecessary installation of good torque converters. Only after a complete diagnostic evaluation can the decision be made to install a new torque converter.

Begin with the normal diagnostic procedures as follows:

1. Preliminary inspection.
2. Know and understand the customer concern.
3. Verify the condition - carry out the Torque Converter Operation Test.
4. Perform diagnostic procedures.
 - Perform On-Board Diagnostic (OBD) test. Refer to **DIAGNOSTICS**.
 - Repair all non-transmission related DTCs first.
 - Repair all transmission-related DTCs.
 - Rerun **OBD** test to verify repair.
 - Perform Stall Speed Test. Refer to **SPECIAL TESTING PROCEDURES**.
 - Perform Diagnostic Routines. Refer to **DIAGNOSIS BY SYMPTOM**.
 - Use the Diagnosis by Symptom to locate the appropriate routine that best describes the symptom(s). The routine will list all possible components that may cause or contribute to the symptom. Check each component listed; diagnose and repair as required before changing the torque converter.

Torque Converter Operation Test

The Torque Converter Operation Test verifies that the Torque Converter Clutch (TCC) control system and the torque converter are operating correctly.

1. Perform a Self Test with the scan tool. Refer to the **INTRODUCTION - GASOLINE MODELS**.

Check for DTCs.

2. Connect a scan tool to the vehicle.
3. Bring the engine to normal operating temperature by driving the vehicle at highway speeds in the (D) position.
4. After normal operating temperature is reached, maintain a constant speed of about 56 km/h (35 mph) in 5th gear for 10 seconds.
5. Release the accelerator pedal and monitor the scan tool Throttle Position (TP) voltage to approximately 1.25 volts or 25% throttle.
6. Monitor the TCC and RPM TCM PID. The TCC should release and engine rpms should increase before the 5-4 shift occurs.

NOTE: **The following is a list of common vehicle concerns that have been misdiagnosed as TCC shudder. For diagnosis of the following items, refer to the appropriate procedure(s) of the appropriate article and the INTRODUCTION - GASOLINE MODELS .**

- Spark plugs - check for cracks, high resistance or broken insulators
- Ignition coil-on-plug - misfire
- Fuel injector - filter may be plugged
- Fuel contamination - engine driveability concerns
- EGR valve - valve may let in too much exhaust gas and cause engine to run lean
- Vacuum leak - engine will not get correct air/fuel mixture
- Manifold Absolute Pressure (MAP) and Mass Air Flow (MAF) sensor - incorrect air/fuel mixture
- Heated Oxygen Sensor (HO2S) - too rich/lean air/fuel mixture
- Fuel pressure - may be too low
- Engine mounts - loose/damaged mounts can cause vibration concerns
- Axle joints - check for vibration

VISUAL INSPECTION

A visual inspection will identify modifications or additions to the vehicle operating system that may affect diagnosis. Inspect the vehicle for non-Ford factory add-on devices such as:

- Electronic add-on items:
 - A/C
 - generator (alternator)
 - engine turbo
 - cellular telephone
 - cruise control
 - CB radio
 - linear booster
 - backup alarm signal
 - computer
- Vehicle modification:

These items, if not installed correctly, will affect the PCM, Transmission Control Module (TCM) or transmission function. Pay particular attention to add-on wiring splices in the PCM harness or transmission wiring harness, abnormal tire size or axle ratio changes.

- Leaks; Refer to **LEAKAGE INSPECTION**.
- Correct selector lever adjustments; refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** .

Selector Lever Check

Check for a misadjustment in the selector lever by matching the detents in the Transmission Range (TR) selector lever with those of the manual control lever in the transmission.

Hydraulic leakage at the manual control valve can cause delay in engagements and/or slipping while operating if the linkage is not correctly adjusted. Refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** for selector lever cable adjustment.

Check TSBs and On-Line Automotive Service Information System (OASIS)

Refer to all TSB and On-Line Automotive Service Information System (OASIS) messages that pertain to the transmission concern and follow the procedure as described.

Carry Out On-Board Diagnostic (OBD) Key ON Engine OFF (KOEO), Key ON Engine Running (KOER)

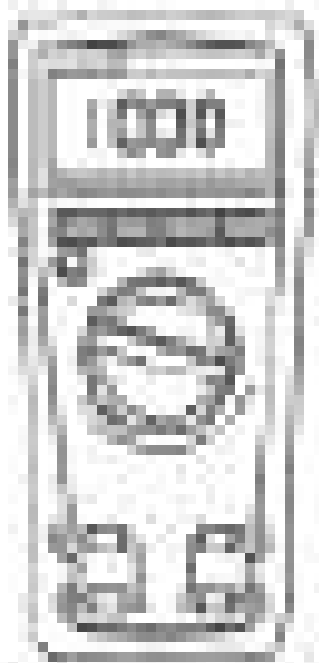
After a road test, with the vehicle warm and before disconnecting any connectors, perform a Self Test using the scan tool. Refer to the **INTRODUCTION - GASOLINE MODELS** .

DIAGNOSTICS

Special Tool(s)

SPECIAL TOOL SPECIFICATION

	<p>Fluke 77-IV Digital Multimeter FLU77-4 or equivalent</p>
--	---



ST2023-A



ST2034-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Diagnosing an electronically controlled automatic transmission is simplified by using the following procedures. One of the most important things to remember is that there is a definite procedure to follow. Do not take shortcuts or assume that critical checks or adjustments have already been made. Follow the procedures as written to avoid missing critical components or steps. By following the diagnostic sequence, the technician will be able to diagnose and repair the concern the first time.

On-Board Diagnostic (OBD) With Scan Tool

NOTE: For detailed instruction and other diagnostic methods using the scan tool, refer to the scan tool tester manual and the INTRODUCTION - GASOLINE MODELS . These self-tests should be used to diagnose the PCM and should be carried out in order.

- Self Test 1.0 - Visual Inspection
- Self Test 2.0 - Set Up
- Self Test 3.0 - Key ON Engine OFF (KOEO)
- Self Test 4.0 - Continuous Memory
- Self Test 5.0 - Key ON Engine Running (KOER)
- Special Test Mode
 - Wiggle Test
 - Output Test Mode
- PCM Reset Mode
- Clearing DTCs
- **OBD Drive Cycle**

Other Scan Tool Features

For information on other diagnostic testing features using the scan tool, refer to the INTRODUCTION - GASOLINE MODELS .

OUTPUT STATE CONTROL (OSC) MODE

On-Board Diagnostic (OBD)

Output State Control Mode

Output state control allows the technician to take control of certain parameters to function the transmission.

For example, output state control allows the technician to shift the transmission only when commanding a gear change. If the technician commands 1st gear in output state control, the transmission will remain in 1st gear until the technician commands the next gear.

Another example of the output state control features is that a technician can command the torque converter to turn ON or OFF to check operation.

This transmission output state control has one mode of operation; DRIVE. This mode has a unique set of operating requirements that the technician must meet before allowed to operate the torque converter or select gears.

NOTE: To operate output state control, the Transmission Range (TR) sensor and the Output Shaft Speed (OSS) sensor must be operational. No DTCs related to the TR sensor or the OSS sensor can be present.

- The vehicle requirements MUST BE MET when SENDING the output state control value. Refer to

the vehicle requirements for each test.

- If the vehicle requirements are NOT MET when SENDING the output state control value, an ERROR MESSAGE will appear. Output state control is aborted and must be restarted.
- If, after the sent value is substituted, the vehicle requirements are no longer met, the PCM will cancel the output state control value and resume normal operations. No error message will be sent.

DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART

The following is a list of output state control parameters and their corresponding PIDs:

Diagnostic PID Chart

DIAGNOSTIC PID CHART


PID Name	PID Description	Units
APP_R	Accelerator Pedal Position (APP) Relative	0% - 100%
AST	Time Since Start	Time
CLRDIST	Distance Since Diagnostic Trouble Codes Cleared	Miles
DRIVE	Gear Lever Position - Drive	Yes/No
DTC TCM	Continuous Codes	Number
ECT TCM	Engine Coolant Temperature (ECT) Transmission Control Module	Degrees
ENGLOAD	Engine Load	0% - 100%
GEAR	Gear Commanded by Module	1, 2, 3, 4, 5
GEAR_OSC#	Gear Commanded by Output State Control	1, 2, 3, 4, 5
GEAR_RAT_CMD	Gear Ratio Commanded	Ratio 0-5:1
GEAR_RAT_MES	Gear Ratio Measured	Ratio 0-5:1
MIL_DIS	The Distance Traveled Since the MIL was Activated	Miles
NEUTRAL	Gear Lever Position - Neutral	Yes/No
OSS	Output Shaft Speed (OSS)	rpm
OSS_SRC	Unfiltered OSS	rpm
PCA AMP	PCA Amp	Current
PVT	Pressure Vacuum Transducer	Pressure
PVT	Pressure Vacuum Transducer	Vacuum
REVERSE	Gear Lever Position - Reverse	Yes/No
RPM TCM	Engine Revolutions Per Minute	rpm
SHIFT_TYPE	Shifter Position	Mode
SSA_AMP	Shift Solenoid Pressure Control A (SSPCA)	Current
SSB_AMP	Shift Solenoid Pressure Control B (SSPCB)	Current
SSC_AMP	Shift Solenoid Pressure Control C (SSPCC)	Current
SSD_AMP	Shift Solenoid Pressure Control D (SSPCD)	Current
SSE	Shift Solenoid Pressure Control E (SSPCE)	0% - 100%
TCC AMP	Torque Converter Clutch (TCC) Solenoid Pressure Control	Current
TCC_OSC#	TCC Output State Control	Locked/Unlocked
TC_SLIPACT	Torque Converter Slip Actual	rpm
TC_SLIP_ABSL	Absolute Value of Torque Converter Slip	rpm
TFT	Transmission Fluid Temperature (TFT)	Temp

TORQUE	Net Engine Torque	Torque Nm
TP	Throttle Position (TP) Sensor	0% - 100%
TR	Transmission Range (TR) Sensor	Mode
TSS	Turbine Shaft Speed (TSS)	rpm
TSS_SRC	Unfiltered TSS Sensor	rpm
VPWR TCM	Module Supply Voltage	Voltage
VSS	Vehicle Speed Sensor (VSS)	mph 0-80
WARMUPS	Number of Warm-Ups Since DTCs Cleared	Number

TRANSMISSION DRIVE CYCLE TEST

Special Tool(s)

SPECIAL TOOL SPECIFICATION

 <p>ST2034-A</p>	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
--	--

Material

MATERIAL SPECIFICATION

Item	Specification
Motorcraft® MERCON® LV Automatic Transmission Fluid XT-10-QLV	MERCON® LV

NOTE: Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

NOTE: The Transmission Drive Cycle Test must be followed exactly. Malfunctions must occur 4 times consecutively for shift error DTC to be set, and 5 times consecutively for continuous Torque Converter Clutch (TCC) code to set.

NOTE: When performing the Transmission Drive Cycle Test, refer to the **SOLENOID APPLICATION CHART** for correct solenoid operation.

After performing the Self Test, use the Transmission Drive Cycle Test for checking codes.

1. Record and then clear the DTCs.
2. Warm engine to normal operating temperature.
3. Make sure transmission fluid level is correct.
4. With selector lever in (D), moderately accelerate from stop to 80 km/h (50 mph). This allows the transmission to shift into 6th gear. Hold speed and throttle open steady for a minimum of 15 seconds.
5. With transmission in 6th gear and maintaining steady speed and throttle opening, lightly apply and release the brake to operate stop lamps. Then, hold speed and throttle steady for a minimum of 5 seconds.
6. Brake to a stop and remain stopped for a minimum of 20 seconds.
7. Repeat Steps 4 through 6 at least 5 times.
8. Perform a Self Test and record DTCs.
 - If the DTCs are still present, refer to the **DTC CHART**. Repair all non-transmission DTCs first as they can directly affect the operation of the transmission. Repeat the Self Test and the Road Test to verify the correction. Clear the DTCs, perform a Drive Cycle Test and repeat the Self Test after completing the repair on the DTC.
 - If the tests pass and a concern is still present, Refer to **DIAGNOSIS BY SYMPTOM**, OASIS messages and TSBs for concerns.

After On-Board Diagnostic (OBD)

NOTE: The vehicle wiring harness, PCM and non-transmission sensors may affect transmission operations. Repair these concerns first.

After the On-Board Diagnostic (OBD) test procedures are completed, repair all DTCs.

Begin with non-transmission related DTCs, then repair any transmission-related DTCs. Use the DTC Chart for information on condition and symptoms. This chart will be helpful in referring to the correct manual(s) and aids in diagnosing internal transmission concerns and external non-transmission inputs. The pinpoint tests are used in diagnosing transmission electrical concerns. Make sure that the vehicle wiring harness and the PCM are diagnosed as well. The **INTRODUCTION - GASOLINE MODELS** will aid in diagnosing non-transmission electronic components.

DIAGNOSTIC TROUBLE CODE (DTC) CHARTS

Special Tool(s)

SPECIAL TOOL SPECIFICATION

--	--



ST2034-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Using a scan tool to retrieve DTCs, begin with and repair all non-transmission related DTCs. Start with the U-DTC codes (communication link codes) then repair any transmission-related DTCs.

Limp-home mode is a default condition to protect the engine and transmission when a fault occurs. Limp-home mode depends on the actual gear the vehicle was in when the fault has occurred.

- For gears 1-3, the limp-home default will be 3rd gear.
- For gears 4-6, the limp-home default will be 5th gear.

The limp-home gear will be held until the vehicle is placed in R, P or the vehicle has been restarted. After these action(s) the vehicle will default to the limp-home mode of 3rd gear.

DTC Chart

DTC CHART

DTC	Component	Description	Condition	Symptom	Action
P0218	Transmission Fluid Temperature (TFT)	TFT condition	Transmission Control Module (TCM) has detected a TFT that has exceeded a set temperature.	<ul style="list-style-type: none"> • Aggressive lockup schedule 	PERFORM normal diagnostic for an overheating condition. REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
			TCM has detected a voltage level below	<ul style="list-style-type: none"> • Malfunction Indicator Lamp (MIL) ON • Transmission Control Indicator Lamp (TCIL) ON 	CONNECT the scan tool and monitor the VPWR TCM PID to verify module supply

P0562	Battery	System voltage low	minimum voltage to operate solenoids. Maintains current solenoid state.	<ul style="list-style-type: none"> • No adaptive strategy • No self learning strategy • Default to 3rd or 5th gear • Battery voltage below 9 volts 	voltage to the TCM . REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . GO to <u>PINPOINT TEST A</u> .
P0563	Battery	System voltage high	TCM has detected a voltage level above maximum voltage.	<ul style="list-style-type: none"> • No adaptive strategy • No self learning strategy • MIL may turn ON • Default to 3rd or 5th gear • Battery voltage above 16 volts • Will turn on TCIL 	CONNECT the scan tool and monitor the VPWR TCM PID to verify module supply voltage to the TCM . REFER to the <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> and the <u>INTRODUCTION - GASOLINE MODELS</u> .
P0605	TCM	The TCM Read-Only Memory (ROM) has been corrupted	TCM has detected an internal software concern with ROM .	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	REPROGRAM the original mechatronic to the latest calibration. CLEAR the DTCs. TEST the system for normal operation. If DTCs return, INSTALL a new mechatronic assembly. After installing the new mechatronic assembly, it must be programmed with the latest calibration. PERFORM the Road Test - Adaptive Drive Cycle. REFER to <u>SHIFT POINT ROAD TEST</u> .
P0613	TCM	TCM processor	TCM has detected an internal software issue.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	INSTALL a new mechatronic assembly. After installing the new mechatronic assembly, it must be

					programmed with the latest calibration.
P0634	TCM	TCM module temperature	Internal temperature within TCM too high. Possible restriction in cooling circuit.	<ul style="list-style-type: none"> • MIL ON • Default to 3rd or 5th gear 	CONNECT the scan tool and monitor the TFT PID to verify that a high temperature is present. INSPECT the transmission fluid cooler tubes for possible restrictions (kinked or bent cooler tube). VERIFY correct operation/orientation of the thermal bypass valve. INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0641	TCM	TCM module sensor voltage failed	Sensor reference voltage A circuit open, voltage too high or too low.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear • Low battery voltage under 9 volts. May also cause P0562 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0657	TCM	Actuator supply voltage A circuit open	Power supply actuators open circuit.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0658	TCM	Actuator supply voltage A circuit low	Power supply actuators short circuit to	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd 	REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road Test the

			ground.	or 5th gear	vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0659	TCM	Actuator supply voltage A circuit high	Actuator power supply short circuit to power before key ON.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road Test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0667	TCM	PCM/ECM/ TCM internal temperature sensor range/performance	Substrate temperature sensor.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
					Multiple DTC failure

P0701	Transmission control system	Transmission control system range/performance	TCM has detected a concern with the operational strategy.	<ul style="list-style-type: none"> • TCIL ON • One or more DTCs set causing transmission default to a hydraulic limp-home mode • Default to 3rd or 5th gear 	<p>with conflicting failure mode actions. If other DTCs are present, REPAIR them first. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. REPROGRAM the TCM first. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0705	Transmission Range (TR) sensor	TR sensor circuit error	TCM has detected a TR signal (P, R, N, D, 3, 2 or 1) is out of range.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the appropriate PID to validate that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0711	TFT sensor	TFT sensor circuit range/performance	TCM has detected no TFT change	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd 	<p>INSTALL a new mechatronic unit. After installing the new mechatronic unit,</p>

			during operation.	<ul style="list-style-type: none"> • No TCC 	it must be programmed with the latest calibration.
P0712	TFT sensor	TFT sensor A circuit low	TCM has detected a voltage drop across the TFT sensor exceeds scale set for temperature (grounded circuit).	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0713	TFT sensor	TFT sensor A circuit high	TCM has detected a voltage drop across the TFT sensor; exceeds scale set for temperature.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0714	TFT sensor	TFT sensor A circuit intermittent	TCM has detected no TFT intermittent operation.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0715	Turbine Shaft Speed (TSS) sensor	TSS sensor A circuit	TSS has detected a short circuit to power.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC engagements • Maximum line pressure • No adaptive learning strategy • Default to 3rd gear 	INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0716	TSS sensor	TSS sensor A circuit range/performance	TCM has detected a loss or noisy TSS signal during operation.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • Maximum line pressure • No adaptive learning 	CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . CLEAR the DTCs. TEST the system for normal operation. If

				<ul style="list-style-type: none"> strategy • Default to 3rd gear 	<p>the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0717	TSS sensor	No TSS sensor A circuit no signal	TCM has not detected a TSS signal. No TSS signal when Output Shaft Speed (OSS) signal is present.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • Maximum line pressure • No adaptive learning strategy • Default to 3rd gear 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0720	OSS sensor	No OSS sensor circuit	TCM has detected an OSS short circuit to power.	MIL ON	<p>INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0721	OSS sensor	OSS sensor circuit range/performance	TCM has detected a loss or noisy OSS signal during operation.	MIL ON	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the</p>

					new mechatronic unit, it must be programmed with the latest calibration.
P0722	OSS sensor	No OSS sensor no signal	TCM has not detected a OSS signal. No OSS signal when OSS signal is present.	MIL ON	CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0723	OSS sensor	No OSS sensor circuit intermittent	TCM has detected an intermittent signal.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • Hold in gear currently selected • Maximum line pressure • No adaptive learning strategy 	CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
				<ul style="list-style-type: none"> • MIL ON • TCIL ON • No 6th gear 	FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is

P0729	Transmission	Gear 6 incorrect ratio	No 6th gear ratio detected by the TCM .	<ul style="list-style-type: none"> • No TCC • No adaptive learning strategy • Maximum line pressure • Default to 5th gear 	<p>present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 272. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0731	Transmission	Gear 1 incorrect ratio	No 1st gear ratio detected by the TCM .	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No 1st gear • No TCC • No adaptive learning strategy • Default to 3rd gear • Maximum line pressure 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 215. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0732	Transmission	Gear 2 incorrect ratio	No 2nd gear ratio detected by the TCM .	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC engagements • No adaptive learning strategy • Default to 3rd gear • Maximum line pressure 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 220, 224 and 217.</p>

					REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0733	Transmission	Gear 3 incorrect ratio	No 3rd gear ratio detected by the TCM .	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • No adaptive learning strategy • Default to 4th gear • Maximum line pressure 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 221 or 223. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0734	Transmission	Gear 4 incorrect ratio	No 4th gear ratio detected by the TCM .	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • No adaptive learning strategy • Default to 3rd gear • Maximum line pressure 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 222 or 271. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
				<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to</p>

P0735	Transmission	Gear 5 incorrect ratio	No 5th gear ratio detected by the TCM .	<ul style="list-style-type: none"> • No adaptive learning strategy • Default to 3rd gear • Maximum line pressure 	<p><u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 270 or 273. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0736	Transmission	Reverse incorrect ratio	No reverse gear ratio detected by the TCM .	<ul style="list-style-type: none"> • MIL ON • No TCC • No adaptive learning strategy • Default to 4th gear • Maximum line pressure 	<p>FOLLOW preliminary diagnostics. CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 202 or 205. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0740	TCC solenoid	TCC solenoid circuit open	TCC solenoid VFS 6 circuit fails. Circuit open.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No adaptive learning strategy • Default to 3rd 	<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic</p>

				<ul style="list-style-type: none"> • or 5th gear • No TCC 	<p>contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0741	TCC	TCC solenoid circuit performance or stuck off	TCC solenoid VFS 6, clutch or circuit open.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC 	<p>PERFORM normal diagnostics for TCC . FOLLOW diagnostic Routines 240, 241 and 242. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0742	TCC Solenoid	TCC solenoid circuit stuck on	The TCM has detected a TCC solenoid control circuit shorted to ground.	<ul style="list-style-type: none"> • MIL ON • TCC is disabled • Poor launch performance • Maximum line pressure • Default to 5th gear • DTC P0743 may be set 	<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit.</p>

					After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0743	TCC Solenoid	TCC solenoid circuit electrical	The TCM has detected a TCC solenoid circuit open, shorted to ground or an intermittent.	<ul style="list-style-type: none"> • TCIL ON • TCC is disabled • Maximum line pressure • Poor launch performance • Default to 5th gear • DTCs P0740, P0742 or P0744 may be set 	<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If</p>

P0744	TCC Solenoid	TCC solenoid circuit intermittent	The TCM has detected the TCC solenoid control circuit shorted to power.	<ul style="list-style-type: none"> • MIL ON • TCC is disabled • DTC P0743 may be set 	<p>the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0748	Pressure Control Solenoid A (PCA)	PCA electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • TCIL ON • Maximum line pressure • Default to 5th gear • DTCs P0960, P0962 or P0963 may be set 	<p>CONNECT the scan tool and monitor the PCA PID to verify PCA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the</p>

					new mechatronic unit, it must be programmed with the latest calibration.
P0750	Shift Solenoid A (SSA)	SSA	The TCM has detected that the SSA circuit failed open or shorted to power.	<ul style="list-style-type: none"> • MIL ON • 5th and 6th gear only • Poor launch performance • DTC P0753 may be set 	<p>CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0751	SSA	SSA performance/stuck off	The TCM commanded SSA ON but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • 5th or 6th gear only • Harsh reverse engagement • Neutral or flair condition on downshift • Poor launch performance • DTC P2700 may be set 	<p>DTC P0751 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>

P0752	SSA	SSA stuck on	The TCM commanded SSA OFF but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • Disable 5th and 6th gear • Erratic shifts • Stuck in 4th gear • DTC P2700 may be set 	DTC P0752 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0753	SSA	SSA electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • TCIL ON • 5th and 6th gear only • DTCs P0750, P0973 or P0974 may be set 	CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
					CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION</u>

P0754	SSA	SSA intermittent	The TCM will set this DTC when an intermittent condition (open, short to power or ground) occurs three times for less than 5 seconds with each occurrence.	<ul style="list-style-type: none"> • MIL ON • Unexpected upshifts, downshifts, flairs or neutral conditions 	<p><u>(PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0755	Shift Solenoid B (SSB)	SSB	The TCM has detected that the SSB circuit has failed open or shorted to power.	<ul style="list-style-type: none"> • MIL ON • 3rd and 5th gear only • Harsh 1-3 shift • DTC P0758 may be set 	<p>CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for</p>

					DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0756	SSB	SSB performance/stuck off	The TCM commanded SSB ON but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • Disable 3rd and 5th gear • Neutral or flair condition • Transmission hangs in 2nd on acceleration • DTC P2701 may be set 	DTC P0756 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0757	SSB	SSB stuck on	The TCM commanded SSB OFF but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • Disable 3rd and 5th gear • Neutral or flair condition • Erratic shifts • DTC P2701 may set 	DTC P0757 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0758	SSB	SSB electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • TCIL ON • Default to 3rd or 5th gear depending on the DTC • Minimum or maximum line pressure depending on the DTC (failed voltage high or voltage low) 	CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit.

				<ul style="list-style-type: none"> • DTCs P0755, P0976 or P0977 may be set 	<p>CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0759	SSB	SSB intermittent	<p>The TCM will set this DTC when an intermittent condition (open, short to power or ground) occurs three times for less than 5 seconds with each occurrence.</p>	<ul style="list-style-type: none"> • MIL ON • Unexpected upshifts, downshifts, flairs or neutral conditions 	<p>CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSC PID to verify SSC electrical operation. REFER to</p>

P0760	Shift Solenoid C (SSC)	SSC	The TCM detected that the SSC circuit failed open.	<ul style="list-style-type: none"> • MIL ON • Disable 2nd and 6th gear • Erratic or harsh 1-3 shift • DTC P0763 may be set 	<p><u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0761	SSC	SSC performance/stuck off	The TCM commanded SSC ON but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • Disable 2nd and 6th gear • Neutral or flair condition • DTC P2702 may be set 	DTC P0761 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0762	SSC	SSC stuck on	The TCM commanded SSC OFF but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • 2nd and 6th gear only • Harsh reverse engagement • Erratic shift or stuck in 6th • DTC P2702 may be set 	DTC P0762 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
					CONNECT the scan tool and monitor the SSC PID to verify

P0763	SSC	SSC electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • TCIL ON • Default to 2nd and 6th gear or 1st and 3rd depending on the DTC • Minimum or maximum line pressure depending on the DTC (failed voltage high or voltage low) • DTCs P0760, P0979 or P0980 may be set 	<p>SSC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0764	SSC	SSC intermittent	The TCM will set this DTC when an intermittent condition (open, short to power or ground) occurs three times for less than 5	<ul style="list-style-type: none"> • MIL ON • Unexpected upshifts, downshifts, flairs or neutral conditions 	<p>CONNECT the scan tool and monitor the SSC PID to verify SSC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the</p>

			seconds with each occurrence.		mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0765	Shift Solenoid D (SSD)	SSD	The TCM detected that the SSD circuit failed open.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Disable 1st gear • DTC P0768 may be set 	<p>CONNECT the scan tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
			The TCM commanded	<ul style="list-style-type: none"> • MIL ON • 2nd and 3rd gear only 	DTC P0766 is a non-electrical DTC. CLEAR the DTCs.

P0766	SSD	SSD performance/stuck off	SSD ON but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • Delayed or no reverse engagement • DTC P2703 and/or DTC P2704 may be set 	TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0767	SSD	SSD stuck on	The TCM commanded SSD OFF but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • 4th gear only • DTC P2704 may be set 	DTC P0767 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0768	SSD	SSD electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • TCIL ON • Disable 1st gear or 3rd gear only depending on the DTC • Minimum or maximum line pressure depending on the DTC (failed voltage high or voltage low) • DTCs P0765, P0982 or P0983 may be set 	CONNECT the scan tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
					CONNECT the scan

P0769	SSD	SSD intermittent	<p>The TCM will set this DTC when an intermittent condition (open, short to power or ground) occurs three times for less than 5 seconds with each occurrence.</p>	<ul style="list-style-type: none"> • MIL ON • Unexpected upshifts, downshifts, flairs or neutral conditions 	<p>tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSE PID to verify SSE electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic</p>

P0770	Shift Solenoid E (SSE)	SSE	SSE circuit or solenoid failure.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	contamination. MEASURE the resistance of SSE . If the value is not between 9.5 to 10.5 ohms, INSTALL a new SSE , REFER to <u>MECHATRONIC ASSEMBLY</u> . If the value is between 9.5 to 10.5 ohms, REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0771	SSE	SSE performance/stuck off	The TCM commanded SSE ON but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • 1st, 2nd and 3rd gear only • Erratic shifting, flairs or neutral condition • DTC P0984 may be set 	DTC P0771 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM</u> .
P0772	SSE	SSE stuck on	The TCM commanded SSE OFF but detected a ratio error (mechanical failure).	<ul style="list-style-type: none"> • MIL ON • Disable 1st, 2nd and 3rd gear • 4th gear launch • DTC P0984 may be set 	DTC P0772 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM</u> .
					CONNECT the scan tool and monitor the SSE PID to verify SSE electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION</u>

P0773	SSE	SSE electrical	The TCM will set this DTC along with one or more specific electrical DTCs.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear • DTC P0770 may be set 	<p><u>(PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. MEASURE the resistance of SSE . If the value is not between 9.5 to 10.5 ohms, INSTALL a new SSE , REFER to <u>MECHATRONIC ASSEMBLY.</u> If the value is between 9.5 to 10.5 ohms, REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSE PID to verify SSE electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean</p>

P0774	SSE	SSE intermittent	The TCM will set this DTC when an intermittent condition (open, short to power or ground) occurs three times for less than 5 seconds with each occurrence.	<ul style="list-style-type: none"> • TCIL ON • Hangs In 1st gear • Default to 3rd or 5th gear • DTC P0770 may be set 	the shift solenoid terminals at the leadframe for metallic contamination. MEASURE the resistance of SSE . If the value is not between 9.5 to 10.5 ohms, INSTALL a new SSE , REFER to <u>MECHATRONIC ASSEMBLY</u> . If the value is between 9.5 to 10.5 ohms, REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P07A8	Friction Element D	Friction element D performance/stuck off	The Low/Reverse clutch failed off, ratio error (mechanical failure)	<ul style="list-style-type: none"> • Disable 1st gear • Delayed or no reverse engagement 	DTC P07A8 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM</u> .
P07A9	Friction Element D	Friction element D stuck on	The Low/Reverse clutch failed on, ratio error (mechanical failure)	<ul style="list-style-type: none"> • 1st gear only • High engine rpm 	DTC P07A9 is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM</u> .
P07AA	Friction Element E	Friction element E performance/stuck	Clutch 4, 5, 6 failed off, ratio error	<ul style="list-style-type: none"> • Disable 4th, 5th and 6th gear • Erratic shifts, 	DTC P07AA is a non-electrical DTC. CLEAR the DTCs. TEST the system for normal operation. If

		off	(mechanical failure)	neutral conditions, flair or high engine rpm	the DTC returns, REFER to <u>DIAGNOSIS BY SYMPTOM.</u>
P0781	Transmission	1-2 or 2-1 shift error	Incorrect ratio calculated during shift 1-2 or 2-1.	<ul style="list-style-type: none"> Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material) MIL ON TCIL ON No TCC No adaptive learning strategy Hold in 3rd, 2nd or 4th gear 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 220 or 225. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0782	Transmission	2-3 or 3-2 shift error	Incorrect ratio calculated during shift 2-3.	<ul style="list-style-type: none"> Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material) MIL ON TCIL ON No TCC No adaptive 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 221 or 224. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>

				<p>learning strategy</p> <ul style="list-style-type: none"> • Hold in 4th, 3rd or 2nd gear 	
P0783	Transmission	3-4 or 4-3 shift error	Incorrect ratio calculated during shift 3-4 or 4-3.	<ul style="list-style-type: none"> • Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material) • MIL ON • TCIL ON • No TCC • No adaptive learning strategy • Default to 3rd or 4th gear 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 222 or 223. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0784	Transmission	4-5 or 5-4 shift error	Incorrect ratio calculated during shift 4-5 or 5-4.	<ul style="list-style-type: none"> • Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material) • MIL ON • TCIL ON • No TCC • No adaptive 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 270 or 271. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>

				learning strategy <ul style="list-style-type: none"> • Default to 4th or 5th gear 	
P0829	Transmission	5-6 or 6-5 shift error	Incorrect ratio calculated during shift 5-6 or 6-5.	<ul style="list-style-type: none"> • Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material) • MIL ON • TCIL ON • No TCC • Default to 2nd or 3rd gear 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, see diagnostic Routine 272 or 273. REFER to <u>DIAGNOSIS BY SYMPTOM.</u></p>
P0960	Pressure Control Solenoid A (PCA)	PCA control circuit open	PCA circuit failed during operation.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No adaptive strategy • Maximum line pressure 	<p>CONNECT the scan tool and monitor the PCA PID to verify PCA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the</p>

					vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0962	PCA	PCA control circuit low	Voltage through PCA was not detected when the solenoid was commanded on.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the PCA PID to verify PCA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the PCA PID to verify PCA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION</u></p>

P0963	PCA	PCA circuit high	Voltage through PCA was not detected when the solenoid was commanded on.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Maximum line pressure • No adaptive strategy 	<p><u>(PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0972	Shift Solenoid A (SSA)	SSA control circuit range/performance	SSA control circuit or solenoid failure.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for</p>

					DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0973	SSA	SSA control circuit low	Voltage through SSA was not detected when the solenoid was commanded off. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSA PID to verify SSA electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>.</p>

P0974	SSA	SSA control circuit high	Voltage through SSA was not detected when the solenoid was commanded on. Open or short to power detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0975	Shift Solenoid B (SSB)	SSB control circuit range/performance	SSB control circuit or solenoid failure.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC</p>

					returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0976	SSB	SSB circuit low	Voltage through SSB was not detected when the solenoid was commanded off. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSB PID to verify SSB electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs.</p>

P0977	SSB	SSB circuit high	Voltage through SSB was not detected when the solenoid was commanded on. Open or short to power detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0978	Shift Solenoid C (SSC)	SSC control circuit range/performance	SSC control circuit or solenoid failure.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSC PID to verify SSC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a</p>

					new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0979	SSC	SSC control circuit low	Voltage through SSC was not detected when the solenoid was commanded off. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSC PID to verify SSC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSC PID to verify SSC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for</p>

P0980	SSC	SSC control circuit high	Voltage through SSC was not detected when the solenoid was commanded on. Open or short to power detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0981	Shift Solenoid D (SSD)	SSD control circuit range/performance	SSD control circuit or solenoid failure.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit.</p>

					After installing the new mechatronic unit, it must be programmed with the latest calibration.
P0982	SSD	SSD control circuit low	Voltage through SSD was not detected when the solenoid was commanded off. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
					<p>CONNECT the scan tool and monitor the SSD PID to verify SSD electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. If</p>

P0983	SSD	SSD control circuit high	Voltage through SSD was not detected when the solenoid was commanded on. Open or short to power detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0985	SSE	SSE control circuit low	Voltage through SSE was not detected when the solenoid was commanded off. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the SSE PID to verify SSE electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. MEASURE the resistance of SSE . If the value is not between 9.5 to 10.5 ohms, INSTALL a new SSE , REFER to <u>MECHATRONIC ASSEMBLY</u>. If the value is between 9.5 to 10.5 ohms,</p>

				<p>REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P0986	SSE	SSE control circuit high	<p>Voltage through SSE was not detected when the solenoid was commanded on. Open or short to power detected.</p>	<ul style="list-style-type: none"> • MIL ON • TCIL ON • Default to 3rd or 5th gear <p>CONNECT the scan tool and monitor the SSE PID to verify SSE electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the shift solenoid terminals at the leadframe for metallic contamination. MEASURE the resistance of SSE . If the value is not between 9.5 to 10.5 ohms, INSTALL a new SSE , REFER to <u>MECHATRONIC ASSEMBLY</u>. If the value is between 9.5 to 10.5 ohms, REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a</p>

					new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.
P1707	Transmission	Park/Neutral (P/N) switch circuit failure	Circuit or sensor failure high. Circuit or sensor failure low.	<ul style="list-style-type: none"> • Engine will not crank in P or N or engine will crank in all gears • TCIL ON 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST the system for normal operation. CHECK the shift linkage. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P1910	Reverse lamp circuit	Reverse lamp control circuit open	Control circuit or sensor failure.	<ul style="list-style-type: none"> • Park lock or interlock switched OFF • Reverse lamps may be on at all times • Reverse may not come on 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p> <p>CLEAR the DTCs. TEST system for normal operation. If DTC returns, REFER to <u>EXTERIOR LIGHTING .</u></p>
P1911	Reverse lamp circuit	Reverse lamp control circuit shorted to ground. Circuit low	Circuit or sensor failure.	-	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u></p>

					<p>CLEAR the DTCs. TEST system for normal operation. If DTC returns, REFER to <u>EXTERIOR LIGHTING</u> .</p>
P1912	Reverse lamp circuit	Reverse lamp control circuit shorted to power. Circuit high	Circuit or sensor failure.	<ul style="list-style-type: none"> • Park lock or interlock switched OFF 	<p>CONNECT the scan tool and monitor the appropriate PID to verify that an error is present. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST system for normal operation. If DTC returns, REFER to <u>EXTERIOR LIGHTING</u> .</p>
P2763	TCC	TCC pressure control solenoid control circuit high.	Voltage through TCC was not detected when the solenoid was commanded on. Short to power detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • No adaptive learning strategy • Default to 3rd or 5th gear 	<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the</p>

					new mechatronic unit, it must be programmed with the latest calibration.
P2764	TCC	TCC pressure control solenoid control circuit low.	TCC was not detected when the solenoid was commanded on. Short to ground detected.	<ul style="list-style-type: none"> • MIL ON • TCIL ON • No TCC • No adaptive learn strategy 	<p>CONNECT the scan tool and monitor the TCC PID to verify TCC electrical operation. REFER to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, REMOVE the mechatronic unit. INSPECT and clean the solenoid terminals at the leadframe for metallic contamination. REINSTALL the mechatronic unit. CONNECT the scan tool and CLEAR the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, INSTALL a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
P062F	TCM	Internal control module EEPROM error	Internal TCM with Electrically Erasable Programmable Read-Only Memory (EEPROM) error.	<ul style="list-style-type: none"> • MIL ON • Mechanical limp-home mode 	<p>CLEAR the DTCs. TEST the system for normal operation. If the DTC returns, install a new mechatronic unit. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
				<ul style="list-style-type: none"> • TCIL ON • No TCC 	

U0073	Controller Area Network (CAN)	Control module communication bus off	CAN communication bus off, short circuit CAN high to CAN low.	<ul style="list-style-type: none"> No adaptive learn strategy Default to 3rd gear Maximum line pressure 	REFER to <u>INTRODUCTION - GASOLINE MODELS</u> .
U0100	CAN	Lost communication with ECM/PCM A	CAN link error detected by TCM , between TCM and PCM.	<ul style="list-style-type: none"> TCIL ON No TCC No adaptive learn strategy Default to 3rd gear Maximum line pressure 	REFER to <u>INTRODUCTION - GASOLINE MODELS</u> .
U0155	CAN	Lost communication with Instrument Cluster (IC) control module	CAN link error detected by the TCM and IC .	<ul style="list-style-type: none"> No communication with the IC 	REFER to <u>INTRODUCTION - GASOLINE MODELS</u> .

TRANSMISSION CONNECTOR LAYOUTS

Transmission Vehicle Harness - C1548

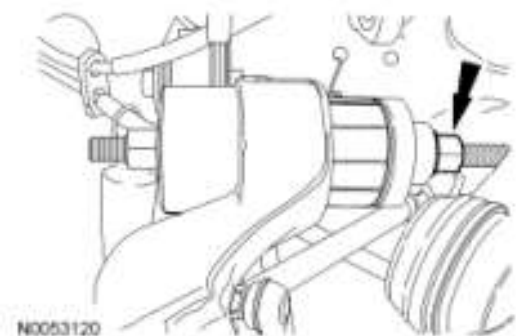


Fig. 99: Identifying Transmission Connector Layouts
Courtesy of FORD MOTOR CO.

FUNCTION CHART

Pin Number	Circuit Function
1	Tow/Haul switch signal
2	Controller Area Network (CAN) low
3	NOT USED
4	NOT USED
5	NOT USED
6	CAN high
7	Reverse lamp relay power
8	NOT USED

9	Ignition voltage
10	Park/Neutral signal
11	NOT USED
12	NOT USED
13	Ground
14	Battery voltage
15	Reverse lamp relay ground
16	Ground

PINPOINT TESTS - OSC EQUIPPED VEHICLE

Special Tool(s)

SPECIAL TOOL SPECIFICATION



Fluke 77-IV Digital Multimeter
FLU77-4 or equivalent

Vehicle Communication Module (VCM) and
Integrated Diagnostic System (IDS) software
with appropriate hardware, or equivalent

scan tool



Any time an electrical connector is disconnected, inspect the connector terminal condition for corrosion and contamination. Also inspect the connector seal for damage. Clean, repair or install a new component as required.

Pinpoint Test

Refer to SYSTEM WIRING DIAGRAMS (Expedition), SYSTEM WIRING DIAGRAMS (Expedition EL), SYSTEM WIRING DIAGRAMS (Navigator) or SYSTEM WIRING DIAGRAMS (Navigator L) for schematic and connector information.

PINPOINT TEST A: SYSTEM VOLTAGE LOW

NOTE: Refer to Transmission Vehicle Harness illustration within the TRANSMISSION CONNECTOR LAYOUTS.

NOTE: Read and record all DTCs.

A1 CHECK FOR DTCs

- Connect the scan tool.
- Ignition ON.
- Check for DTC P0562.
- **Is DTC P0562 set?**

Yes: GO to A2 .

No: REFER to CHARGING SYSTEM .

A2 CHECK BATTERY VOLTAGE

- Measure the voltage across the battery terminals. Record the measurement.

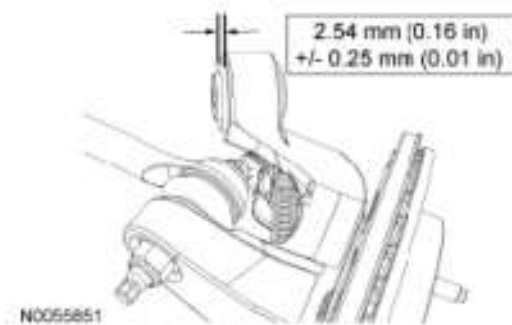


Fig. 100: Measuring Voltage Across Battery Terminals
 Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10.5 volts?**

Yes: GO to A3 .

No: REFER to CHARGING SYSTEM .

A3 CHECK CHARGING SYSTEM

- Start the engine.
- Bring the engine up to normal operating temperature and allow the engine to idle.
- **Is the generator/check engine lamp off?**

Yes: GO to A4 .

No: REFER to CHARGING SYSTEM .

A4 CHECK CHARGING SYSTEM

- Ignition ON.
- With the engine running, increase the engine speed to 2,000 rpm and observe the scan tool VPWR TCM PID.
- **Is the system voltage between 13 volts and 15 volts?**

Yes: GO to A5 .

No: REFER to CHARGING SYSTEM .

A5 CHECK CIRCUIT CBB55 (VT/OG) FOR BATTERY VOLTAGE

- Ignition OFF.
- Disconnect: Transmission C1548.
- Measure the voltage between transmission C1548-9, circuit CBB55 (VT/OG), harness side and ground.

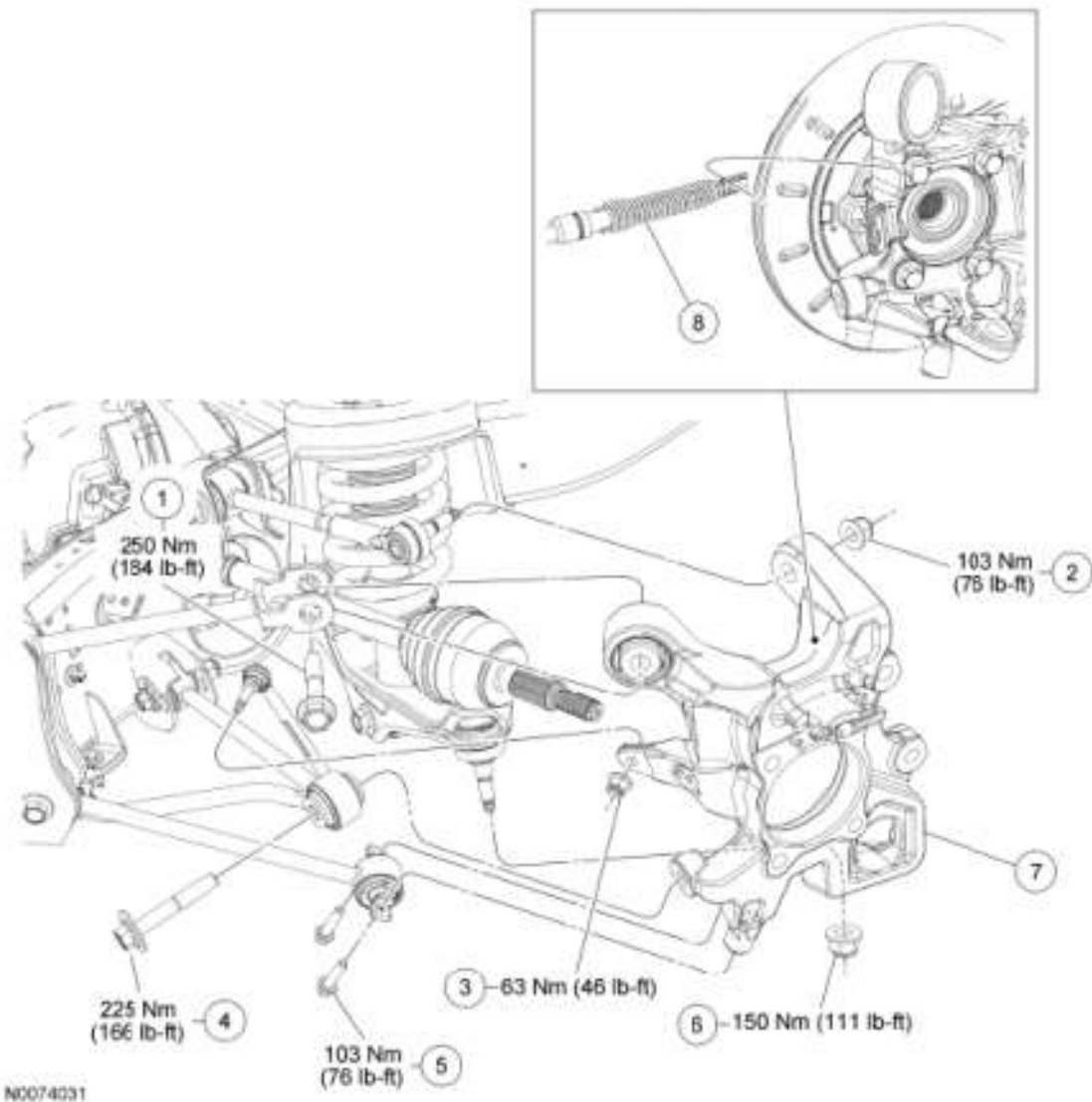


Fig. 101: Checking Circuit CBB55 For Short To Ground
 Courtesy of FORD MOTOR CO.

- **Is the voltage greater than 10.5 volts?**

Yes: REPLACE the mechatronic assembly. REFER to **MECHATRONIC ASSEMBLY**. Program the mechatronic assembly with the latest calibration. CLEAR all DTCs. TEST the system for normal operation.

No: REMOVE and INSPECT fuse 54 (5A). If the fuse is blown, REPAIR circuit CBB55 (VT/OG) for a short to ground. If the fuse is good, REPAIR circuit CBB55 (VT/OG) for an open. CLEAR the DTC. TEST the system for normal operation.

SPECIAL TESTING PROCEDURES

The special tests are designed to aid the technician in diagnosing the hydraulic and mechanical portions of the transmission.

Engine Idle Speed Check

Refer to the **INTRODUCTION - GASOLINE MODELS** for diagnosis and testing of the engine idle

speed.

Air Pressure Test

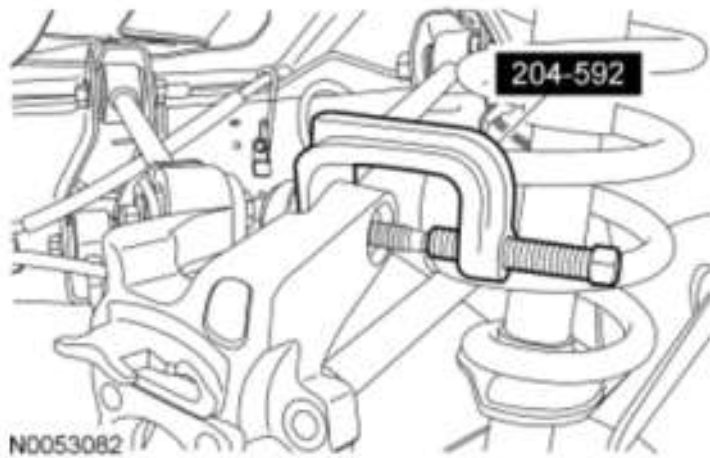


Fig. 102: Identifying Air Pressure Test Ports
Courtesy of FORD MOTOR CO.

DESCRIPTION CHART

Item	Description
1	Intermediate clutch (C) port
2	Low/reverse clutch (D1) port
3	Low/reverse clutch (D2) port
4	Direct clutch (B) port
5	Overdrive (O/D) clutch (E) port
6	Forward clutch (A) port
7	Cooler bypass valve

A no-drive condition can exist, even with correct transmission fluid pressure, because of inoperative clutches or bands. Refer to the **Clutch Application Chart** to determine the appropriate elements. A clutch concern can be located through a series of checks by substituting air pressure for fluid pressure to determine the location of the concern.

Example: When the selector lever is in a forward gear range ((D), 3, 2, 1), a no-drive condition may be caused by an inoperative forward clutch.

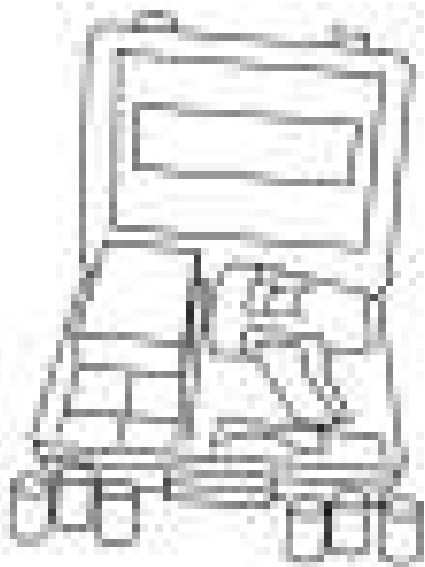
1. Drain the transmission fluid. Remove the transmission fluid pan.
2. Remove the transmission fluid filter and seal assembly and the mechatronics unit.
3. The inoperative clutches can be located by applying air pressure into the appropriate clutch port.
4. Apply air pressure to the appropriate clutch port. A dull thud may be heard or movement felt when a clutch piston is applied. If the clutch seals or check ball are leaking, a hissing may be heard.
5. If the clutches fail to operate during the air check:
 - the piston seals are not seated, damaged or not installed correctly.
 - plugged feed holes for clutch apply in the case and/or clutch cylinder.
 - damaged piston and/or clutch cylinder.

6. Service as required and recheck.

LEAKAGE INSPECTION

Special Tool(s)

SPECIAL TOOL SPECIFICATION



ST1300-A

100W/12 Volt DC UV Lamp
164-R0751 or equivalent



ST2034-A

Vehicle Communication Module (VCM) and
Integrated Diagnostic System (IDS) software
with appropriate hardware, or equivalent
scan tool

Material

MATERIAL SPECIFICATION

Item	Specification
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	-
Motorcraft® MERCON® LV Automatic Transmission Fluid XT-10-QLV	MERCON® LV

The transmission has the following parts to prevent external fluid leakage:

- Gaskets
- Lip-type seals
- O-ring seals
- Seal rings
- Seal grommets
- Seal washers
- Thread sealant

Leakage at the transmission pan-to-case gasket often can be stopped by tightening the bolts to specification. Refer to **TORQUE SPECIFICATIONS**.

When transmission fluid is found to be leaking between the case and the cooler tube fitting, tighten the fitting to maximum specification.

If leakage is found at the manual control lever shaft, install a new seal.

Check for transmission fluid leaking from the end of the extension housing. Leakage can result from a damaged seal, missing garter spring or worn extension bushing. Install a new seal assembly, bushing or both, as necessary.

Fluid Leakage in Torque Converter Area

Transmission fluid leakage at the front of the transmission, as evidenced by transmission fluid around the torque converter housing part of the case, may have several sources. By careful observation it is possible, in many instances, to pinpoint the source of the transmission fluid leak before removing the transmission from the vehicle. The paths which the transmission fluid takes to reach the bottom of the torque converter housing are shown in the illustration. The 6 numbers in the illustration correspond with the 6 flow path steps.

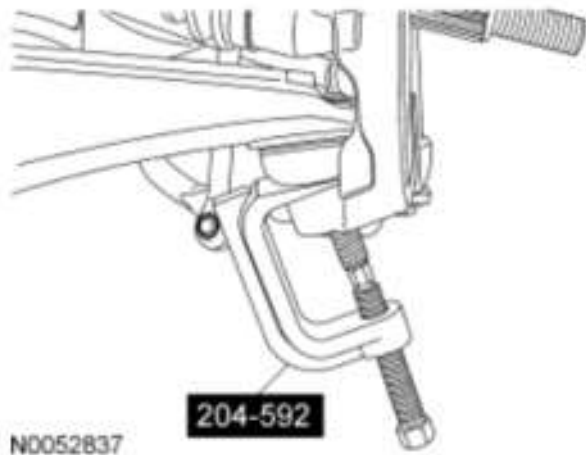


Fig. 103: Identifying Torque Converter Fluid Leakage Area
 Courtesy of FORD MOTOR CO.

SYMPTOM CHART

Leak Path	Symptom	Possible Source
1, 2 and 4	Leak at front of transmission	Pump lip seal
1, 2 and 4	Leak at front of transmission	Vent
1, 2 and 4	Leak at front of transmission	Converter hub weld
1, 2 and 4	Leak at front of transmission	External pump seal (large)
1, 2 and 4	Leak at front of transmission	Pump-to-case fasteners
1, 2 and 4	Leak at front of transmission	Pump body seal
3	Leak at front of transmission	Torque converter seal weld
5	Leak at front of transmission	Engine oil leak; rear main seal
5	Leak at front of transmission	Engine valve cover
5	Leak at front of transmission	Oil galley
5	Leak at front of transmission	Pump lip seal
5	Leak at front of transmission	Engine oil pressure sensor
6	Leak at front of transmission	Torque converter rivet

Leak Check Test with A Black Light

NOTE: Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 is used to detect a transmission fluid leak.

Add dye to the transmission fluid. Use one 30 ml (1 oz) of dye solution for every 3.8L (4 qt) of transmission fluid. Add additional transmission fluid until it is at the correct level. Such dyes can be used to determine whether an engine fluid or transmission fluid leak is present, or if the fluid in the transmission fluid cooler leaks into the engine coolant system. An ultraviolet light must be used to detect the fluorescent dye solution.

1. Remove the transmission fluid level fill plug and note the color of the transmission fluid that drips out. Original factory fill transmission fluid is clear and red if the transmission fluid has been exchanged.
2. Clean off any transmission fluid from the top and bottom of the torque converter housing, front of the case and rear face of the engine and oil pan. Clean the torque converter area by washing with a suitable non-flammable solvent and blow-dry with compressed air.

3. Wash out the torque converter housing and the front of the flexplate. The torque converter housing may be washed out using clean solvent and a squirt-type oil can. Blow-dry all washed areas with compressed air.
4. Using the scan tool, start and run the engine until the transmission reaches its normal operating temperature. Shift the transmission through all the gear ranges to make sure that the dye has circulated through the transmission. Using the 110W/12 Volt DC UV Lamp, observe the back of the cylinder block and top of the torque converter housing for evidence of transmission fluid leakage. Observe the front of the flexplate, back of the cylinder block (in as far as possible) and inside the torque converter housing and front of the case. Run the engine until transmission fluid leakage is evident and the probable source of leakage can be determined. Repair as required.

External Transmission Fluid Leaks

EXTERNAL TRANSMISSION FLUID LEAKS CHART

Description	Possible Source
Leaks at the transmission fluid pan to case	<ul style="list-style-type: none"> • Transmission fluid pan bolts not tightened to specification • Transmission fluid pan gasket damaged • Case transmission fluid pan rail damaged
Transmission fluid cooler tubes or O-rings leaking	<ul style="list-style-type: none"> • Transmission fluid cooler tube(s), transmission fluid cooler tube O-rings damaged • Transmission fluid cooler tube hold-down plate damaged
Leaks at the transmission fluid cooler	<ul style="list-style-type: none"> • Transmission fluid cooler damaged • Transmission fluid cooler tube O-rings damaged
Leaks at the manual control lever	<ul style="list-style-type: none"> • Manual control lever seal missing or damaged
Mechatronic harness connector	<ul style="list-style-type: none"> • O-ring on connector missing or damaged

Transmission Fluid Cooler Tube Replacement

For transmission fluid cooler tube installation, refer to [TRANSAXLE/TRANSMISSION COOLING](#) .

TRANSMISSION FLUID COOLER

NOTE: When a transmission has been disassembled to install new parts, the transmission fluid cooler and transmission fluid cooler tubes must be cleaned and backflushed.

NOTE: Cleaning and backflushing the transmission fluid cooling system, along with following all the normal cleaning and inspection procedures during disassembly and reassembly, will keep contaminants from entering the transmission, causing a repeat repair.

When internal wear or damage has occurred in the transmission, metal particles, clutch plate material or band material may have been carried into the torque converter and transmission fluid cooler. These contaminants are a major cause of recurring transmission troubles and must be removed from the system before the transmission is put back into use. For backflushing and cleaning procedures, refer to [TRANSMISSION FLUID COOLER BACKFLUSHING AND CLEANING](#).

DIAGNOSIS BY SYMPTOM

The Diagnosis By Symptom gives the technician diagnostic information and direction, and suggests possible components using a symptom as a starting point. All routines start out with any potential electrical components that can cause or contribute to the symptom described. The routines then list all possible hydraulic or mechanical components that can cause or contribute the symptom described.

Diagnosis by Symptom Chart Directions

1. Using the Diagnosis by Symptom, select the condition that best describes the condition.
2. Refer to the Routine indicated in the Diagnosis by Symptom Index.
3. Always begin diagnosis of a symptom with:
 1. preliminary inspections.
 2. verifications of condition.
 3. checking the fluid levels.
 4. perform other test procedures as directed.

NOTE: Not all concerns and conditions with electrical components will set a DTC. Be aware that the components listed may still be the cause. Verify correct function of these components prior to proceeding to the Hydraulic/Mechanical Routine listed.

4.

NOTE: When the battery is disconnected or a new battery is installed, certain transmission operating parameters can be lost. The Transmission Control Module (TCM) must relearn these parameters. During this learning process, slightly firm shifts, delayed or early shifts may be experienced. This operation is considered normal and will not affect the function of the transmission. Normal operation will return once these parameters are stored by the TCM .

Begin with the ROUTINES, if indicated. Follow the reference or action required statements. Always perform the On-Board Diagnostic (OBD) tests as required. Never skip steps. Repair as required. If the concern is still present after electrical diagnosis, then proceed to the Hydraulic/Mechanical Routine listed.

5. The list contains only possible hydraulic or mechanical components that may cause or contribute to the concern. These components are listed in the removal sequence and by most probable cause. All components listed must be inspected to make sure that repairs are complete.

Diagnosis by Symptom Index

SYMPTOM CHART

Title	Routines
Engagement Concerns	
No Forward In Drive	201
No Reverse	202
Harsh Reverse	203
Harsh Forward	204

Delayed/Soft Reverse	205
Delayed/Soft Forward	206
No Forward and No Reverse	207
Harsh Forward and Harsh Reverse	208
Delayed Forward and Delayed Reverse	209
Shift Concerns	
Some/All Shifts Missing	210
Timing - Early/Late	211
Timing - Erratic/Hunting	212
Feel Concerns	
Soft/Slipping (some or all)	213
Harsh (some or all)	214
No 1st Gear, Engages in Higher Gear	215
No Manual 1st Gear	216
No Manual 2nd Gear	217
No Manual 3rd Gear	218
No 1-2 Shift	220
No 2-3 Shift	221
No 3-4 Shift	222
No 4-5 Shift	270
No 5-6 Shift	272
No 6-5 Shift	273
No 5-4 Shift	271
No 4-3 Shift	223
No 3-2 Shift	224
No 2-1 Shift	225
Torque Converter Operation Concerns	
No Apply	240
Cycling/Chatter	241
Always Applied/Stalls Vehicle	242
Other Concerns	
External Leaks	252
Noise/Vibration in Forward or Reverse	254
Engine Will Not Crank	255
No Park (P) Range	256
Transmission Overheating	257
Fluid Venting/Foaming	261

Diagnostic Routines

Engagement Concerns: No Forward in Drive

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS NO FORWARD IN DRIVE

Possible Component	Reference/Action
201 - ROUTINE	

Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Selector Lever Linkage	
<ul style="list-style-type: none"> • Selector lever linkage - damage or incorrectly adjusted 	<ul style="list-style-type: none"> • Inspect and repair as required. Verify selector lever cable adjustment. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . Adjust selector lever cable as necessary.
Mechatronics	
<ul style="list-style-type: none"> • Electronic component - failure 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Defective Shift Solenoid A (SSA) 	<ul style="list-style-type: none"> • Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Defective manual valve 	<ul style="list-style-type: none"> • Inspect manual valve linkage.
<ul style="list-style-type: none"> • Defective clutch A regulator valve 	<ul style="list-style-type: none"> • Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> • Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> • Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> • Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> • Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> • Inspect the low/reverse clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.
Pump	
<ul style="list-style-type: none"> • Pump gear - failure 	<ul style="list-style-type: none"> • Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.

Engagement Concerns: No Reverse

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS NO REVERSE

Possible Component	Reference/Action
202 - ROUTINE	
Transmission Fluid	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Incorrect level 	
Selector Lever Linkage	<ul style="list-style-type: none"> • Inspect and repair as required. Verify selector lever cable adjustment. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . Adjust selector lever cable as necessary.
<ul style="list-style-type: none"> • Selector lever linkage - damage or incorrectly adjusted 	
Mechatronics	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration. • Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration. • Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> • Electronic component - failure 	
<ul style="list-style-type: none"> • Defective Shift Solenoid B (SSB) 	
<ul style="list-style-type: none"> • Defective direct clutch (B) or low/reverse clutch (D) regulator valve 	
Clutch Plates	<ul style="list-style-type: none"> • Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> • Direct clutch (B) friction and steel plate - failure 	
Pump	<ul style="list-style-type: none"> • Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.
<ul style="list-style-type: none"> • Pump gear - failure 	

Engagement Concerns: Harsh Reverse

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS HARSH REVERSE

Possible Component	Reference/Action

203 - ROUTINE

Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Mechatronics	
<ul style="list-style-type: none"> • Electronic component - failure 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> • Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Defective clutch B regulator valve 	<ul style="list-style-type: none"> • Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> • Transmission Control Module (TCM) mechatronic unit - failed 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Driveline	
<ul style="list-style-type: none"> • Engine driveline looseness in the driveshaft, U-joints or the engine mounts 	<ul style="list-style-type: none"> • Repair as required.

Engagement Concerns: Harsh Forward Only**DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS HARSH FORWARD ONLY**

Possible Component	Reference/Action
204 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Mechatronics	
<ul style="list-style-type: none"> • Electronic 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test

component - failure	the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u> . After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid A (SSA) 	<ul style="list-style-type: none"> Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch A regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch A latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> TCM mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Driveline	<ul style="list-style-type: none"> Repair as required.
<ul style="list-style-type: none"> Engine driveline looseness in the driveshaft, U-joints or the engine mounts 	

Engagement Concerns: Delayed/Soft Reverse Only

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS DELAYED/SOFT REVERSE ONLY

Possible Component	Reference/Action
205 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and

Solenoid B (SSB)	check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u> . After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Transmission Control Module (TCM) mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.

Engagement Concerns: Delayed/Soft Forward Only

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS DELAYED/SOFT FORWARD ONLY

Possible Component	Reference/Action
206 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid A (SSA) 	<ul style="list-style-type: none"> Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch A latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Transmission Control Module (TCM) mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.

Engagement Concerns: No Forward and No Reverse

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS NO FORWARD AND NO REVERSE

Possible Component	Reference/Action
207 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Mechatronics	
<ul style="list-style-type: none"> • Defective manual valve 	<ul style="list-style-type: none"> • Inspect manual valve linkage.
Pump	
<ul style="list-style-type: none"> • Pump gear - failure 	<ul style="list-style-type: none"> • Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.

Engagement Concerns: Harsh Forward and Harsh Reverse

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS HARSH FORWARD AND HARSH REVERSE SPECIFICATION

Possible Component	Reference/Action
208 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> • Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, Transmission Control Module (TCM), external vehicle wiring harnesses, solenoids, Transmission Range (TR) sensor, Shift Solenoid A (SSA), Pressure Control Solenoid A (PCA) 	<ul style="list-style-type: none"> • Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
<ul style="list-style-type: none"> • Multiple shift missing (more than one gear) 	<ul style="list-style-type: none"> • If some shifts are missing, determine which shifts do not occur. Refer to clutch and solenoid application charts. Monitor appropriate PIDs as listed in diagnostics. Refer to Routine 210.
Mechatronics	
<ul style="list-style-type: none"> • Electronic component - failure 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC</u>

	<u>ASSEMBLY</u> . After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Gears 4-6 default to 5th gear and gears 1-3 default to 3rd gear 	<ul style="list-style-type: none"> Retrieve DTCs.

Engagement Concerns: Delayed Forward and Delayed Reverse

DIAGNOSTIC ROUTINES - ENGAGEMENT CONCERNS DELAYED FORWARD AND DELAYED REVERSE

Possible Component	Reference/Action
209 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>. Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	
Mechatronics	
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.

Shift Concerns: Some/All Shifts Missing

DIAGNOSTIC ROUTINES - SHIFT CONCERNS SOME/ALL SHIFTS MISSING

Possible Component	Reference/Action
210 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>. Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	
Selector Lever Linkage Damaged or Incorrectly Adjusted	
<ul style="list-style-type: none"> Selector lever cable 	<ul style="list-style-type: none"> Inspect and repair as required. Verify selector lever cable adjustment. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . Adjust selector lever cable as necessary.
Forward Clutch (A) Assembly (No Shifts)	
<ul style="list-style-type: none"> Seals, piston - damaged 	<ul style="list-style-type: none"> Inspect for damage. Repair as required.
<ul style="list-style-type: none"> Friction elements - damaged or worn 	<ul style="list-style-type: none"> Inspect for damage. Repair as required.

<ul style="list-style-type: none"> Return springs - damaged 	<ul style="list-style-type: none"> Inspect for damage. Repair as required.
Powertrain Control System	
<ul style="list-style-type: none"> PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses, solenoids, Transmission Range (TR) sensor, Shift Solenoid A (SSA), Pressure Control Solenoid A (PCA) 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
<ul style="list-style-type: none"> Multiple shift missing (more than one gear) 	<ul style="list-style-type: none"> If some shifts are missing, determine which shifts do not occur. Refer to the Clutch and Solenoid Application Charts. Monitor appropriate PIDs as listed in diagnostics.

Shift Concerns: Timing - Early/Late

DIAGNOSTIC ROUTINES - SHIFT CONCERNS TIMING - EARLY/LATE

Possible Component	Reference/Action
211 - ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
<ul style="list-style-type: none"> Engine driveability concerns 	<ul style="list-style-type: none"> Refer to <u>ENGINE SYSTEM - GENERAL INFORMATION</u> .
Mechatronics	
<ul style="list-style-type: none"> Bolts not tightened to specification 	<ul style="list-style-type: none"> Tighten to specification.
<ul style="list-style-type: none"> Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Incorrect Pressures	
<ul style="list-style-type: none"> Application pressures are incorrect 	<ul style="list-style-type: none"> Incorrect application pressures may be due to non-transmission components, mechatronic assembly or internal transmission damage. Repair all non-transmission components then continue with this routine.
Other	
<ul style="list-style-type: none"> Tire size change, axle ratio change 	<ul style="list-style-type: none"> Verify that the vehicle has the original equipment. Refer to the <u>VEHICLE CERTIFICATION (VC) LABEL</u> . Changes in tire size and axle ratio will affect shift timing.

Shift Concerns: Timing - Erratic/Hunting (Some/All)

DIAGNOSTIC ROUTINES - SHIFT CONCERNS TIMING - ERRATIC/HUNTING (SOME/ALL)

--	--

Possible Component	Reference/Action
212 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Condition 	<ul style="list-style-type: none"> • Carry out Transmission Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
<ul style="list-style-type: none"> • Transmission fluid over temperature condition 	<ul style="list-style-type: none"> • Refer to <u>Transmission Overheating</u>, Routine 257.
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> • Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
Torque Converter Concerns	
<ul style="list-style-type: none"> • Torque Converter Clutch (TCC) 	<ul style="list-style-type: none"> • Refer to <u>TCC</u> operation concern: cycling shutter chatter.

Shift Concerns: Feel - Soft or Slipping (Some or All)

DIAGNOSTIC ROUTINES - SHIFT CONCERNS FEEL - SOFT OR SLIPPING (SOME OR ALL)

Possible Component	Reference/Action
213 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> • Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> • Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
Transmission Fluid Temperature (TFT) Sensor Damaged	
<ul style="list-style-type: none"> • Mechatronic assembly 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the TFT terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new

	mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Bolts not tightened to specification 	<ul style="list-style-type: none"> • Tighten to specification. • Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> • Mechatronic unit contaminated, solenoid (s) damaged, stuck or bore damaged. Manual valve damaged, stick or bore damaged 	

Shift Concerns: Feel - Harsh (Some/All)

DIAGNOSTIC ROUTINES - SHIFT CONCERNS FEEL - HARSH (SOME/ALL)

Possible Component	Reference/Action
214 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>. • Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
<ul style="list-style-type: none"> • Transmission fluid filter and seal assembly - plugged, damaged 	
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> • Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Re-flash mechatronic assembly to the latest calibration. Carry out road test - adaptive drive cycle, refer to <u>SHIFT POINT ROAD TEST</u>. Road test and perform the OBD test again.
Mechatronics	
<ul style="list-style-type: none"> • Bolts not tightened to specification 	<ul style="list-style-type: none"> • Tighten bolts to specification.
<ul style="list-style-type: none"> • Mechatronic assembly contaminated, solenoid(s) damaged, solenoids stuck or bore damaged 	<ul style="list-style-type: none"> • Inspect for damage. If damaged install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>. • Inspect for damage. If damaged install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> • Manual valve damaged, stuck or bore damaged 	

Shift Concerns: No 1st Gear in Drive, Engages in a Higher Gear

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 1ST GEAR IN DRIVE, ENGAGES IN A HIGHER GEAR

Possible Component	Reference/Action
215 - ROUTINE	
Powertrain Control System	

<ul style="list-style-type: none"> PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
Incorrect Gear	<ul style="list-style-type: none"> Determine which gear the transmission is in. Refer to the Clutch and Solenoid Application Charts.
<ul style="list-style-type: none"> Mechatronic failure 	

Shift Concerns: No 1st Gear Manual

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 1ST GEAR MANUAL

Possible Component	Reference/Action
216 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK.</u> Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER.</u>
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	
Selector Lever Linkage	
<ul style="list-style-type: none"> Selector lever cable system - damaged, misaligned 	<ul style="list-style-type: none"> Inspect and repair as necessary.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY.</u> Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY.</u> After installing the new mechatronic unit, it must be programmed with the latest calibration. Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY.</u> Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY.</u> After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid A (SSA) 	
Powertrain Control System	
<ul style="list-style-type: none"> PCM electrical inputs/outputs, Transmission Control 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required.

Module (TCM), vehicle wiring harnesses	Clear the DTCs. Road test and perform the OBD test again.
Clutch Plates	
<ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> • Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> • Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> • Inspect the low/reverse clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.
Pump	
<ul style="list-style-type: none"> • Pump gear - failure 	<ul style="list-style-type: none"> • Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.

Shift Concerns: No 2nd Gear Manual

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 2ND GEAR MANUAL

Possible Component	Reference/Action
217 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> • Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Selector Lever Linkage	
<ul style="list-style-type: none"> • Selector lever cable system - damaged, misaligned 	<ul style="list-style-type: none"> • Inspect and repair as necessary.
Mechatronics	
<ul style="list-style-type: none"> • Electronic component - failure 	<ul style="list-style-type: none"> • Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> • Defective Shift Solenoid A (SSA) 	<ul style="list-style-type: none"> • Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.

Powertrain Control System	
<ul style="list-style-type: none"> PCM electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
Clutch Plates	
<ul style="list-style-type: none"> Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the low/reverse clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.
Pump	
<ul style="list-style-type: none"> Pump gear - failure 	<ul style="list-style-type: none"> Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.

Shift Concerns: No 3rd Gear Manual

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 3RD GEAR MANUAL

Possible Component	Reference/Action
218 - ROUTINE	
Selector Lever Linkage	
<ul style="list-style-type: none"> Selector lever cable system - damaged, misaligned 	<ul style="list-style-type: none"> Inspect and repair as necessary.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
Powertrain Control System	
<ul style="list-style-type: none"> PCM electrical 	

inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs. Road test and perform the OBD test again.
Clutch Plates	
<ul style="list-style-type: none"> Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Low/reverse clutch (D) friction and steel plate - failure. 	<ul style="list-style-type: none"> Inspect the low/reverse clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.
Pump	
<ul style="list-style-type: none"> Pump gear - failure 	<ul style="list-style-type: none"> Install a new pump assembly. Refer to <u>PUMP ASSEMBLY</u>.

Shift Concerns: No 1-2 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 1-2 SHIFT

Possible Component	Reference/Action
220 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C (SSC) 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
	<ul style="list-style-type: none"> Inspect and clean the SSD terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.

<ul style="list-style-type: none"> Defective Shift Solenoid D (SSD) 	<p>Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.</p>
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the intermediate clutch assembly for damage. Repair as required. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the low/reverse clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 2-3 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 2-3 SHIFT

Possible Component	Reference/Action
221 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> Incorrect level 	<ul style="list-style-type: none"> Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> Transmission fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> Install a new transmission fluid filter assembly. Refer to <u>FLUID PAN, GASKET AND FILTER</u>.
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and

Solenoid B (SSB)	check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u> . After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C (SSC) 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the intermediate clutch assembly for damage. Repair as required. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 3-4 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 3-4 SHIFT

Possible Component	Reference/Action
222 - ROUTINE	
<u>Mechatronics</u>	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.

<ul style="list-style-type: none"> Defective Shift Solenoid D (SSD) 	<ul style="list-style-type: none"> Inspect and clean the SSD terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid E (SSE) 	<ul style="list-style-type: none"> Inspect and clean the SSE terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch E regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective solenoid multiplex valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Overdrive (O/D) clutch (E) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the O/D clutch assembly for damage. Repair as required. Refer to <u>OVERDRIVE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 4-3 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 4-3 SHIFT

Possible Component	Reference/Action
223 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.

<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid D (SSD) 	<ul style="list-style-type: none"> Inspect and clean the SSD terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch E regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch E latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Solenoid multiplex valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Drive enable valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Overdrive (O/D) clutch (E) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the O/D clutch assembly for damage. Repair as required. Refer to <u>OVERDRIVE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 3-2 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 3-2 SHIFT

Possible Component	Reference/Action
224 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.

<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C (SSC) 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the Overdrive (O/D) clutch assembly for damage. Repair as required. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 2-1 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 2-1 SHIFT

Possible Component	Reference/Action
225 - ROUTINE	
<u>Mechatronics</u>	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C (SSC) 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new

	mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch D regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.

Torque Converter Clutch (TCC) Operation Concerns: Does Not Apply

DIAGNOSTIC ROUTINES - TORQUE CONVERTER CLUTCH (TCC) OPERATION CONCERNS DOES NOT APPLY

Possible Component	Reference/Action
240 - ROUTINE	
Transmission Fluid	<ul style="list-style-type: none"> Carry out the Transmission Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
<ul style="list-style-type: none"> Condition 	
Mechatronics	
<ul style="list-style-type: none"> Defective Torque Converter Clutch (TCC) solenoid 	<ul style="list-style-type: none"> Inspect and clean the TCC solenoid terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective torque converter apply regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective torque converter release regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic assembly bolts - not tightened to specification 	<ul style="list-style-type: none"> Tighten to specification.
<ul style="list-style-type: none"> Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore 	

damaged. Manual valve damaged, stuck or bore damaged	assembly. Refer to <u>MECHATRONIC ASSEMBLY</u> .
PCM	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs, road test and perform the OBD test again.
<ul style="list-style-type: none"> Powertrain control system electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses, TCC solenoid, Transmission Fluid Temperature (TFT) sensor 	
Torque Converter	<ul style="list-style-type: none"> Remove the transmission. Inspect for damage. Install a new or remanufactured torque converter. Refer to <u>TRANSMISSION - FOUR WHEEL DRIVE (4WD)</u> or <u>TRANSMISSION - REAR WHEEL DRIVE (RWD)</u>.
<ul style="list-style-type: none"> Torque converter components 	

Torque Converter Clutch (TCC) Operation Concerns: Cycling/Chatter

DIAGNOSTIC ROUTINES - TORQUE CONVERTER CLUTCH (TCC) OPERATION CONCERNS CYCLING/CHATTER

Possible Component	Reference/Action
241 - ROUTINE	
Transmission Fluid	<ul style="list-style-type: none"> Carry out the Transmission Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
<ul style="list-style-type: none"> Condition 	
Mechatronics	<ul style="list-style-type: none"> Inspect and clean the TCC solenoid terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration. Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Tighten to specification. Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective Torque Converter Clutch (TCC) solenoid 	
<ul style="list-style-type: none"> Defective torque converter apply regulator valve 	
<ul style="list-style-type: none"> Mechatronic assembly bolts - not tightened to specification 	
<ul style="list-style-type: none"> Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	
PCM	

<ul style="list-style-type: none"> Powertrain control system electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses, TCC solenoid, Transmission Fluid Temperature (TFT) sensor 	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs, road test and perform the OBD test again.
Torque Converter	<ul style="list-style-type: none"> Remove the transmission. Inspect for damage. Install a new or remanufactured torque converter. Refer to <u>TRANSMISSION - FOUR WHEEL DRIVE (4WD)</u> or <u>TRANSMISSION - REAR WHEEL DRIVE (RWD)</u>.
<ul style="list-style-type: none"> Torque converter components 	

Torque Converter Clutch (TCC) Operation Concerns: Always Applied/Stalls Vehicle

DIAGNOSTIC ROUTINES - TORQUE CONVERTER CLUTCH (TCC) OPERATION CONCERNS ALWAYS APPLIED/STALLS VEHICLE

Possible Component	Reference/Action
242 - ROUTINE	
Transmission Fluid	<ul style="list-style-type: none"> Carry out the Transmission Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
<ul style="list-style-type: none"> Condition 	
Mechatronics	<ul style="list-style-type: none"> Inspect and clean the TCC solenoid terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration. Tighten to specification. Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective Torque Converter Clutch (TCC) solenoid 	
<ul style="list-style-type: none"> Mechatronic assembly bolts - not tightened to specification Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	
PCM	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Repair as required. Clear the DTCs, road test and perform the OBD test again.
<ul style="list-style-type: none"> Powertrain control system electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses, TCC solenoid, Transmission Fluid Temperature (TFT) sensor 	

Torque Converter	
<ul style="list-style-type: none"> • Torque converter components 	<ul style="list-style-type: none"> • Remove the transmission. Inspect for damage. Install a new or remanufactured torque converter. Refer to <u>TRANSMISSION - FOUR WHEEL DRIVE (4WD)</u> or <u>TRANSMISSION - REAR WHEEL DRIVE (RWD)</u>.

Other Concerns: External Leaks

DIAGNOSTIC ROUTINES - OTHER CONCERNS EXTERNAL LEAKS

Possible Component	Reference/Action
252 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Transmission case vent - damaged, case porosity 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Leakage at gaskets, seals, bulkhead connector 	<ul style="list-style-type: none"> • Refer to <u>LEAKAGE INSPECTION, Fluid Leakage in Torque Converter Area</u> and <u>Leak Check Test with A Black Light</u> . Remove all traces of lubricant on exposed surface of the transmission. Repair as necessary.
Transmission Fluid Cooler Tubes	
<ul style="list-style-type: none"> • Transmission fluid cooler tube fittings 	<ul style="list-style-type: none"> • Locate leak source. Repair as required. Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u> .
<ul style="list-style-type: none"> • Transmission fluid cooler tube O-rings, transmission fluid cooler tubes 	<ul style="list-style-type: none"> • Locate leak source. Repair as required. Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u> .
Torque Converter	
<ul style="list-style-type: none"> • Torque converter studs 	<ul style="list-style-type: none"> • Install a new torque converter.
<ul style="list-style-type: none"> • Torque converter hub seal 	<ul style="list-style-type: none"> • Install a new torque converter hub seal.
<ul style="list-style-type: none"> • Torque converter weld 	<ul style="list-style-type: none"> • Install a new torque converter.
Transmission Case	
<ul style="list-style-type: none"> • Case - leaking 	<ul style="list-style-type: none"> • Install a new transmission case. Refer to <u>TRANSMISSION</u>.
<ul style="list-style-type: none"> • Transmission electrical connector 	<ul style="list-style-type: none"> • Install a new transmission electrical connector O-ring.
<ul style="list-style-type: none"> • Transmission fluid fill plug 	<ul style="list-style-type: none"> • Install a new transmission fluid fill plug.
<ul style="list-style-type: none"> • Output shaft seal 	<ul style="list-style-type: none"> • Install a new seal. Refer to <u>OUTPUT SHAFT SEAL</u>.
<ul style="list-style-type: none"> • Manual control valve lever seal 	<ul style="list-style-type: none"> • Install a new seal.

<ul style="list-style-type: none"> • Transmission fluid pan seal (gasket) 	<ul style="list-style-type: none"> • Install a new seal.
Fluid Pump	
<ul style="list-style-type: none"> • Fluid pump O-ring 	<ul style="list-style-type: none"> • Install a new O-ring. Refer to <u>PUMP ASSEMBLY</u>.
<ul style="list-style-type: none"> • Fluid pump seal ring 	<ul style="list-style-type: none"> • Install a new seal ring. Refer to <u>PUMP ASSEMBLY</u>.

Noise/Vibration - Forward or Reverse

NOTE: NVH symptoms should be identified using the diagnostic tools that are available. For a list of these tools, an explanation of their uses and a glossary of common terms, refer to **NOISE, VIBRATION & HARSHNESS**. Since it is possible any one of multiple systems may be the cause of a symptom, it may be necessary to use a process of elimination type of diagnostic approach to pinpoint the responsible system. If this is not the causal system for the symptom, refer back to **NOISE, VIBRATION & HARSHNESS** for the next likely system and continue diagnosis.

DIAGNOSTIC ROUTINES - NOISE/VIBRATION - FORWARD OR REVERSE

Possible Component	Reference/Action
254 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level (low) pump cavitation 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Transmission Fluid Cooler Tubes	
<ul style="list-style-type: none"> • Transmission fluid cooler tubes grounding out 	<ul style="list-style-type: none"> • Adjust or reposition cooler tubes.
Torque Converter	
<ul style="list-style-type: none"> • Check the torque converter components/balance weight 	<ul style="list-style-type: none"> • Locate source of disturbance. Repair as required.
Engine Driveline	
<ul style="list-style-type: none"> • Engine drive accessories 	<ul style="list-style-type: none"> • Refer to <u>ENGINE SYSTEM - GENERAL INFORMATION</u>.

Engine Will Not Crank

DIAGNOSTIC ROUTINES - ENGINE WILL NOT CRANK

Possible Component	Reference/Action
255 - ROUTINE	
Selector Lever Cable System	
<ul style="list-style-type: none"> • Selector lever cable system - damaged, misaligned 	<ul style="list-style-type: none"> • Inspect and repair as necessary. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u>.
Powertrain Control System	
<ul style="list-style-type: none"> • Electrical inputs/outputs, 	

Transmission Control Module (TCM), vehicle wiring harnesses, engine starting system, Transmission Range (TR) sensor	<ul style="list-style-type: none"> Perform On-Board Diagnostic (OBD) tests. Refer to the <u>INTRODUCTION - GASOLINE MODELS</u> for diagnosis and testing of engine components. Check PIDs for TR park and neutral positions. Repair as required. Clear the DTCs, road test and perform the OBD test again.
Torque Converter	
<ul style="list-style-type: none"> Flexplate - damaged 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.
Vehicle Starter	
<ul style="list-style-type: none"> Starter system concerns 	<ul style="list-style-type: none"> Inspect and repair as necessary. Refer to <u>STARTING SYSTEM</u>.
TR Sensor Assembly	
<ul style="list-style-type: none"> TR assembly - damaged 	<ul style="list-style-type: none"> Inspect and repair as necessary.
Fluid Pump Assembly	
<ul style="list-style-type: none"> Internal parts seized 	<ul style="list-style-type: none"> Inspect for damage. Repair as necessary.

No Park Range

DIAGNOSTIC ROUTINES - NO PARK RANGE

Possible Component	Reference/Action
256 - ROUTINE	
Selector Lever Cable	
<ul style="list-style-type: none"> Selector lever cable system - damaged, misaligned 	<ul style="list-style-type: none"> Inspect and repair as necessary.
<ul style="list-style-type: none"> Manual control lever assembly damaged, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged, park pawl pin loose or damaged, park rod actuating plate loose, damaged or missing 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Transmission case assembly 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> Park gear, park pawl, park pawl return spring, part or guide, park actuating rod, park pawl shaft, manual lever 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> External linkages/brackets - damaged 	<ul style="list-style-type: none"> Inspect for damage. If damaged, repair as necessary.
Transmission Range (TR) Assembly Damaged	
<ul style="list-style-type: none"> Manual lever detent spring 	
<ul style="list-style-type: none"> TR assembly 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.

Transmission Overheating

DIAGNOSTIC ROUTINES - TRANSMISSION OVERHEATING

Possible Component	Reference/Action
257 - ROUTINE	

Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
<ul style="list-style-type: none"> • Condition 	<ul style="list-style-type: none"> • Carry out the Transmission Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
Powertrain Control System	
<ul style="list-style-type: none"> • Electrical inputs/outputs, Transmission Control Module (TCM), vehicle wiring harnesses, Torque Converter Clutch (TCC) solenoid 	<ul style="list-style-type: none"> • Perform On-Board Diagnostic (OBD) tests. Refer to the <u>INTRODUCTION - GASOLINE MODELS</u> for diagnosis and testing of engine components. Check PIDs for Transmission Range (TR) park and neutral positions. Repair as required. Clear the DTCs, road test and perform the OBD test again.
Torque Converter Not Engaging	
<ul style="list-style-type: none"> • Torque converter 	<ul style="list-style-type: none"> • Install a new torque converter.
Case Vent Damaged	
<ul style="list-style-type: none"> • Transmission case assembly 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
Other	
<ul style="list-style-type: none"> • Restriction in transmission cooling system 	<ul style="list-style-type: none"> • Check transmission cooling system efficiency. Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u> for automatic transmission cooling system diagnostic procedures.
<ul style="list-style-type: none"> • Excessive trailer tow load 	<ul style="list-style-type: none"> • Refer to the Owner's Literature for specifications on trailer towing.
<ul style="list-style-type: none"> • Vehicle heat shield - missing or damaged 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Vehicle airflow is restricted 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<ul style="list-style-type: none"> • Thermal bypass valve - missing or damaged 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary. Refer to <u>MECHATRONIC ASSEMBLY</u>

Fluid Venting/Foaming

DIAGNOSTIC ROUTINES - FLUID VENTING/FOAMING

Possible Component	Reference/Action
261 - ROUTINE	
Transmission Fluid	
<ul style="list-style-type: none"> • Incorrect level 	<ul style="list-style-type: none"> • Check the transmission fluid level. Adjust transmission fluid to correct level. Refer to <u>TRANSMISSION FLUID LEVEL CHECK</u>.
Case Vent Damaged	
<ul style="list-style-type: none"> • Transmission case assembly 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.

Shift Concerns: No 4-5 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 4-5 SHIFT

Possible Component	Reference/Action
270 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid A (SSA) 	<ul style="list-style-type: none"> Inspect and clean the SSA terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch A regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch A latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.

Shift Concerns: No 5-4 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 5-4 SHIFT

--	--

Possible Component	Reference/Action
271 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch A regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Forward clutch (A) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the forward clutch assembly for damage. Repair as required. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>.

Shift Concerns: No 5-6 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 5-6 SHIFT

Possible Component	Reference/Action
272 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new

	mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid B (SSB) 	<ul style="list-style-type: none"> Inspect and clean the SSB terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C (SSC) 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the Overdrive (O/D) clutch assembly for damage. Repair as required. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 6-5 Shift

DIAGNOSTIC ROUTINES - SHIFT CONCERNS NO 6-5 SHIFT

Possible Component	Reference/Action
273 - ROUTINE	
Mechatronics	
<ul style="list-style-type: none"> Electronic component - failure 	<ul style="list-style-type: none"> Remove the mechatronic unit. Inspect and clean the shift solenoid terminals on the mechatronic leadframe for metallic contamination. Install the mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u>. After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective Shift Solenoid C 	<ul style="list-style-type: none"> Inspect and clean the SSC terminals on the mechatronic leadframe for metallic contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>. Connect the scan tool and clear the DTCs. Road test the vehicle and

(SSC)	check for DTCs. If the DTC returns, install a new mechatronic unit. Refer to <u>MECHATRONIC ASSEMBLY</u> . After installing the new mechatronic unit, it must be programmed with the latest calibration.
<ul style="list-style-type: none"> Defective clutch B regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch B latch valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Defective clutch C regulator valve 	<ul style="list-style-type: none"> Inspect mechatronic assembly for stuck valves or contamination. Refer to <u>MECHATRONIC ASSEMBLY</u>.
<ul style="list-style-type: none"> Mechatronic unit - failed 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MECHATRONIC ASSEMBLY</u>.
Clutch Plates	
<ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the direct clutch assembly for damage. Repair as required. Refer to <u>DIRECT CLUTCH ASSEMBLY</u>.
<ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Inspect the Overdrive (O/D) clutch assembly for damage. Repair as required. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY</u>.