Transmission Control Systems: Testing and Inspection
CVT Automatic Transmission

Diagnostic Strategy
Diagnostic Strategy

Troubleshooting an electronically controlled automatic transaxle 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 these publications available:
^ Computers and Control Systems
^ Technical Service Bulletins (TSBs)
^ Wiring Diagram

These publications provide the information required when diagnosing transaxle concerns.

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

Preliminary Inspection
^ Know and understand the customer's concern.
^ Verify the concern by operating the vehicle.
^ Check the fluid levels and condition.
^ Check for non-factory add-on items.
^ Check shift linkages for correct adjustment.
^ Check TSBs regarding the concern.

Diagnostics
^ Carry out on-board diagnostic procedures Key On/Engine Off (KOEO) and Key On/Engine Running (KOER).
^ Record all diagnostic trouble codes (DTCs).
^ Repair all non-transaxle DTC codes first.
^ Repair all transaxle DTC codes second.
^ Erase 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. See: Diagnosis By Symptom

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

Diagnostic Flow Chart
Diagnostic Flow Chart

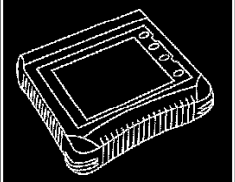
Prior to carrying out the flow, test these items should be checked:

Diagnostic Flow Chart		
• Know and understand the customer concerns. • Check the fluid level and condition. • Verify the concern by operating the vehicle. • Check for non-factory-installed items and verify correct installation. • Check the shift linkage adjustments. • Check TSBs and OASIS messages for vehicle concerns. • Carry out quick test both KOER and KOEO. • Record all codes.		
1) Did you record any Diagnostic Trouble Codes?	Yes	• REPAIR all hard non-transmission Diagnostic Trouble Codes first. REFER to the appropriate pinpoint tests listed in Computers and Control Systems for diagnosis and repair of non-transmission DTCs. Then for Transmission DTCs follow the pinpoint tests. GO to Step 2.
	No	• REFER to Diagnosis By Symptom then GO to Step 5.
2) Are any continuous test memory codes present?	Yes	• CLEAR codes and CARRY OUT drive cycle test, then GO to Step 3.
	No	• GO to Step 4.
3) Did the continuous test memory codes reappear?	Yes	• REPAIR all hard non-transmission Diagnostic Trouble Codes first. REFER to the appropriate pinpoint tests listed in Computers and Control Systems for diagnosis and repair of non-transmission DTCs. Then for Transmission DTCs follow the pinpoint tests. GO to Step 4.
	No	• GO to Step 4.
4) Is the concern repaired?	Yes	• CARRY OUT the final quick test to verify that no Diagnostic Trouble Codes (DTC) are present. CLEAR memory codes.
	No	• REFER to Diagnosis By Symptom to diagnose and repair the concern, then GO to Step 5.
5) Is the concern repaired?	Yes	• CARRY OUT the final quick test to verify that no diagnostic trouble codes are present. CLEAR memory codes.
	No	• Further diagnosis is required.

Diagnostic Flow Chart

Preliminary Inspection

Preliminary Inspection

Special Tool(s)	
 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool

Special Tool(s)

These 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 complaint or condition. Customer contact may be required in order to begin to verify the concern. Understand the conditions involved 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 verifying the concern.

Verification of Condition

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

These procedures must be used when verifying customer concerns for the transaxle.

Determine Customer Concern

NOTE: Some transaxle conditions may cause engine concerns. An electronic pressure control short circuit can cause engine misfiring. If the torque converter clutch does not disengage, the engine will stall.

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

^ Hot or cold vehicle operating temperature
^ Hot or cold ambient temperatures
^ Type of terrain
^ Vehicle loaded/unloaded
^ City/highway driving
^ Coasting
^ Engagement
^ Noise/vibration - check for dependencies, either rpm dependent, vehicle speed dependent, shift dependent, gear dependent, range dependent or temperature dependent
^ Check the CVT transmission fluid level.

High Fluid Level

A fluid level that is too high may cause the fluid to become aerated due to the churning action of the rotating internal parts. This will cause foaming, loss of fluid from the vent tube, fluid level indicator tube and possible transaxle malfunction and/or damage. If an overfill reading is indicated, loosen the fluid drain plug and allow a small amount of fluid to drain and re-check fluid level.

Low Fluid Level

A low fluid level could result in poor transaxle engagement, slipping of the chain, malfunction and damage to the transaxle variators. This could also indicate a leak in one of the transaxle seals or gaskets. Under normal circumstances, the fluid level should be checked during normal maintenance. If the transaxle starts to slip or shows signs of fluid leaking, the fluid level and DTCs should be checked.

Adding Fluid

CAUTION: The use of any other type of transmission fluid than specified will result in transaxle malfunction and/or damage.

If fluid needs to be added, add fluid in **0.25L (1/2 pint) increments** through the fluid fill plug located on the top of the transaxle near the fluid level indicator. Do not overfill the fluid.

Fluid Condition Check

NOTE: The continuously variable transaxle (CVT) fluid is bluish-green when it is new. The CVT fluid will darken from bluish-green to darker green or brown as it ages. If there is an internal concern with a mechanical component, there will be metallic residue in the pan. With other transmission fluids, the odor was an indicator of heat damage or other concerns. With CVT fluid, the odor will not indicate heat damage or other concerns.

1. Check the fluid level.
2. Observe the color. The color under normal circumstances should be bluish green when new and will darken to dark green or brown as it ages, not black.
3. Hold the fluid level indicator over a white facial tissue and allow the fluid to drip onto the facial tissue and examine the stain.
4. If evidence of solid material is found, the transmission fluid pan should be removed for further inspection.
5. If fluid contamination or transaxle failure is confirmed by the sediment in the bottom of the fluid pan, the transaxle must be disassembled and completely cleaned or installed new.
6. If the transaxle is to be overhauled or if installing a new transaxle, install a new transmission fluid cooler and clean and flush the fluid cooler tubes.

7. Carry out diagnostic checks and adjustments. Refer to Diagnosis By Symptom. See: Diagnosis By Symptom

Visual Inspection

Visual Inspection

This 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:

^ NON OEM electronic add-on items
- Remote starter equipment
- Air conditioning
- Generator (alternators)
- Engine turbo
- Cellular telephone
- Cruise control
- CB radio
- Linear amplifiers
- Backup alarm signal
- Computer

^ Vehicle modification:
- These items, if not installed correctly, will affect the powertrain control module (PCM), or transaxle function. Pay particular attention to add-on wiring splices in the PCM harness or transaxle wiring harness, abnormal tire size, or axle ratio changes.
- Damaged, bent, broken or loose fluid cooler tubes.
- Leaks. Refer to Leakage Inspection. See: Automatic Transmission/Transaxle/Testing and Inspection/CVT Automatic Transmission
- Correct linkage adjustments.

Shift Linkage Check

Hydraulic leakage at the manual control valve can cause delay in engagements and/or variator slipping while operating, if the linkage is not correctly adjusted.

Check TSBs

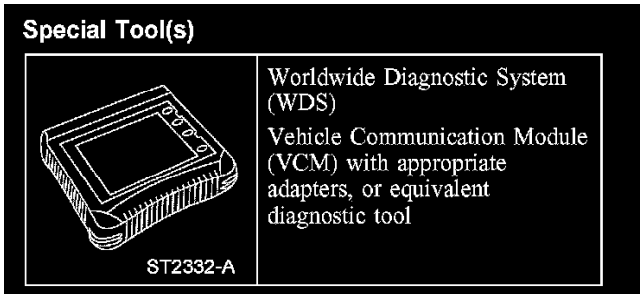
Refer to all technical service bulletins which pertain to the concern and follow the procedure.

Carry Out On-Board Diagnostics (KOEO, KOER)

After a road test, with the vehicle warm and before disconnecting any connectors, carry out the Quick Test using the diagnostic tool. Refer to Computers and Control Systems for diagnosis and testing of the powertrain control system.

Displaying & Reading Trouble Codes

Diagnostics



Special Tool(s)

On-Board Diagnostic (OBD) With Diagnostic Tool

NOTE: For detailed instruction and other diagnostic methods using the diagnostic tool or equivalent, refer to the diagnostic tool tester manual and Computers and Control Systems.

These Quick Tests should be used to diagnose the powertrain control module (PCM) and should be carried out in order.

^ Quick Test 1.0 - Visual Inspection
^ Quick Test 2.0 - Set Up
^ Quick Test 3.0 - Key On, Engine Off (KOEO)
^ Quick Test 4.0 - Continuous Memory Codes
^ Quick Test 5.0 - Key On, Engine Running (KOER)
^ Special Test Modes
- Wiggle Test Mode
- Output Test Mode

^ PCM Reset Mode
^ Clearing DTCs P1000

^ On-Board Diagnostic (OBD) II Drive Cycle
^ Other Diagnostic Tool Features

For other diagnostic testing features using the diagnostic tool, refer to Computers and Control Systems. Other diagnostic methods include:
^ Parameter Identification (PID) Access Mode
^ Freeze Frame Data Access Mode
^ Oxygen Sensor Monitor Mode

Trouble Code Diagnostic Charts

Diagnostic Trouble Code Charts

Special Tool(s)

Diagnostic Trouble Code Chart

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0604	TCM	Transaxle Control Module (TCM) Random Access Memory (RAM) Error	TCM detected a failed data check of RAM.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0605	TCM	TCM Read Only Memory (ROM) Error	TCM detected a failed data check of ROM.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. REFLASH the TCM. If program is successful, ERASE the DTC codes. If reflash fails, INSTALL a new mechatronic unit.
P0710	TFT	Transmission Fluid Temperature (TFT) Sensor A Circuit	TCM detected TFT sensor out of range -55°C-175°C (-67°F-347°F).	• Will turn on driver warning lamp.	GO to Pinpoint Test B.
P0711	TFT	Transmission Fluid Temperature (TFT) Sensor A Circuit	TCM detected an erratic change in temperature. Temperature signal changing too fast.	• Will turn on driver warning lamp.	GO to Pinpoint Test B.

Diagnostic Trouble Code Chart (Part 1)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0714	TFT	Transmission Fluid Temperature (TFT) Sensor A Circuit Intermittent	TCM detected the TFT temperature different than the set scale.	• Will turn on driver warning lamp.	GO to Pinpoint Test B.
P0218	TFT	Transmission Fluid Over Temperature Condition Indicated	The TCM detected that the transmission fluid temperature exceeded 115°C (239°F).	• Will turn on driver warning lamp at 130°C (266°F).	REFER to Diagnosis By Symptom.
P0613	TCM	Electrically Erasable Programmable Read Only Memory (EEPROM) Error	TCM detected a failed data check of EEPROM.	• Slight shift engagements concerns. • Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. REFLASH the TCM. If program is successful, ERASE the DTC codes. If reflash fails, INSTALL a new mechatronic unit.
P0562	TCM	TCM Power Input Signal Low	DTC will set if engine running and input voltage to the TCM is lower than 9 volts. DTC will set if the battery has been disconnected for an extended period of time.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	GO to Pinpoint Test H.

Diagnostic Trouble Code Chart (Part 2)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0563	TCM	TCM Power Input Signal High	DTC will set if engine running and input voltage to the TCM is higher than 17 volts.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	GO to Pinpoint Test H.
P0634	TCM	TCM Internal Temperature Too High	The TCM detected that the transmission fluid temperature exceeded 130°C (266°F).	Will turn on driver warning lamp at 130°C (266°F).	REFER to Diagnosis By Symptom
P0840	Main Pressure Sensor	Transmission Main Fluid Pressure Sensor A Circuit	TCM detected the main pressure sensor value is out of range 0-7,300 kPa (0-1,059 psi).	• Will turn on driver warning lamp.	GO to Pinpoint Test A.
P0845	Secondary Pulley Pressure Sensor	Secondary Pulley Fluid Pressure Sensor B Circuit	TCM detected secondary pulley pressure sensor value is out of range 0-7,300 kPa (0-1,059 psi).	• Will turn on driver warning lamp.	GO to Pinpoint Test A.
P0868	Transmission Fluid Pressure	Transmission Fluid Pressure Low	DTC will be set if an insufficient fluid supply is detected at the pressure sensor(s). This could be caused by defective pressure sensor(s) or a hydraulic system leakage. It is also possible to have no pressure due to very cold fluid -20°C (-4°F).	• No torque converter lock-up. • Delayed engagements are possible (no pressure because of very cold fluid).	GO to Pinpoint Test A.

Diagnostic Trouble Code Chart (Part 3)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0871	Transmission Secondary Fluid Pressure Sensor	Transmission Secondary Fluid Pressure Sensor Circuit C	DTC will be set if secondary pulley pressure is lower or higher than expected. This indicates a defect pressure sensor or a leakage of the hydraulic system.	• Marginal loss of acceleration. • Will turn on driver warning lamp.	GO to Pinpoint Test A.
P0615	Starter Relay Circuit (Start Interlock)	Starter Relay Circuit Pin 10 Shorted to Power or Ground	Starter circuit pin 10 shorted.	• No engagement. • Will turn on driver warning lamp.	DISCONNECT the TCM control module. Visually check the connector for bent or broken pins.
P0960	PCA	Pressure Control Solenoid A Control Circuit Open	Main pressure driver output open.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0961	PCA	Pressure Control Solenoid A Out Of Range	DTC will be set if main pressure is lower or higher than expected. This indicates a defective pressure sensor or a leakage of the hydraulic system.	• Marginal loss of power/acceleration • Will turn on driver warning lamp.	GO to Pinpoint Test A.

Diagnostic Trouble Code Chart (Part 4)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0962	PCA	Pressure Control Solenoid A Control Circuit Low	Main pressure driver output shorted to ground.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0963	PCA	Pressure Control Solenoid A Control Circuit High	Main pressure driver output shorted to power.	• Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 5)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0964	PCB	Pressure Control Solenoid B Control Circuit Open	Primary pulley driver output open.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0966	PCB	Pressure Control Solenoid B Control Circuit Low	Primary pulley driver output shorted to ground.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 6)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0967	PCB	Pressure Control Solenoid B Control Circuit High	Primary pulley driver output shorted to power.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0968	PCC	Pressure Control Solenoid C Control Circuit Open	Second pulley driver output open.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 7)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0970	PCC	Pressure Control Solenoid C Control Circuit Low	Second pulley driver output shorted to ground.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0971	PCC	Pressure Control Solenoid C Control Circuit High	Second pulley driver output shorted to power.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 8)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0740	TCC	Torque Converter Clutch Solenoid Circuit Open	Torque converter clutch solenoid driver output open.	• No torque converter lock-up. • Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0741	TCC	Torque Converter Clutch (TCC) Solenoid Circuit Performance or Stuck Off	The TCM picked up an excessive amount of TCC slippage during normal vehicle operation.	• Torque converter lock/unlock. • Engine RPM may be higher than expected. • Lack/loss of power/acceleration. • Will turn on driver warning lamp.	GO to Pinpoint Test D.
P0742	TCC	Torque Converter Clutch Solenoid Circuit Stuck On	TCC clutch driver output shorted to ground.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 9)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0743	TCC	Torque Converter Clutch Solenoid Circuit Electrical	TCC clutch driver output shorted to power.	• No torque converter lock-up • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0900	Clutch Actuator	Clutch Actuator Solenoid Open Circuit	Forward, reverse clutch driver output open.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Harsh engagement concerns. • Will turn on warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 10)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0902	Clutch Actuator	Clutch Actuator Circuit Low	Forward, reverse clutch driver output short to ground.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0903	Clutch Actuator	Clutch Actuator Circuit High	Forward, reverse clutch driver output short to power.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Harsh engagement concerns. • Will turn on warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0810	Clutch Position Control	Clutch Position Control Error	TCM detect a sticking clutch due to a clutch opening error.	• Engine driveability concerns (reduced engine performance). • Will turn on driver warning lamp.	GO to Pinpoint Test E.
P0811	Forward or Reverse Clutch	Excessive Clutch Slippage	Excessive forward and reverse clutch slipping.	• Engine driveability concerns (reduced engine performance). • Will turn on driver warning lamp.	GO to Pinpoint Test E.

Diagnostic Trouble Code Chart (Part 11)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0730	Gear Ratio	Incorrect Gear Ratio	TCM detected the variator ratio is out of spec or an incorrect ratio.	• No torque converter lock-up. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	GO to Pinpoint Test A.
P0701	Transmission Control System	Transmission Control System	TCM has detected other transaxle DTCs setting this DTC enables limp home mode.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	FIX other transaxle DTC first. CLEAR DTCs.
P0702	Transmission Control Electrical System	Transmission Control Electrical System Error	Error detected during initialization of the TCM.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0705	Transmission Range (TR) Sensor	Transmission Range Sensor Circuit A	Internal components damaged, circuit A failure.	• Different ratio behavior (increased engine rpm). • Lack/loss of power/acceleration. • Will turn on driver warning lamp.	GO to Pinpoint Test C.

Diagnostic Trouble Code Chart (Part 12)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0715	TSS	Turbine Shaft Speed Sensor Circuit A	TCM detected a loss of TSS signal during operation. Insufficient input from the turbine shaft speed sensor.	• Engagement concerns. Harsh/erratic. • Will turn on driver warning lamp.	GO to Pinpoint Test G.
P0716	TSS	Turbine Shaft Speed Sensor Circuit A High	TCM detected a faulty TSS sensor. TSS signal higher than mechanically possible during operation.	• Engine driveability concerns (loss of engine power). • Engagement concerns. • Will turn on driver warning lamp.	GO to Pinpoint Test G.
P0219	Engine	Engine RPM or Vehicle Speed Limit Reached	Engine speed and turbine speed is higher than the maximum allowed speed of the engine.	• Engine RPM too high or too low. • Open clutch during operation (loss of power). • Will turn on driver warning lamp.	REFER to Computers and Control Systems.
P2765	Primary Pulley Speed Sensor A	No or incorrect signal from primary pulley speed sensor	TCM detected a faulty pulley A speed sensor at the TCM.	• Engage concerns. • Will turn on driver warning lamp.	GO to Pinpoint Test I.
P2766	Primary Pulley Speed Sensor A	No or incorrect signal from primary pulley speed sensor	TCM detected a faulty pulley A speed. Signal higher than mechanically possible during operation.	• Engage concerns. • Will turn on driver warning lamp.	GO to Pinpoint Test I.
P0720	OSS	Output Shaft Speed Sensor Circuit	TCM detected a faulty output shaft speed sensor.	• Engage concerns. • Will turn on MIL and driver warning lamp.	GO to Pinpoint Test F.
P0721	OSS	Output Shaft Speed Sensor Circuit	TCM has detected an erratic OSS signal.	• Engage concerns. • Will turn on driver warning lamp.	GO to Pinpoint Test F.

Diagnostic Trouble Code Chart (Part 13)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
U0301	Software Incompatible	Software Incompatible With the Powertrain Control Module (PCM)	Software is different than the vehicle configuration.	• Engine driveability concerns.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. REFLASH the TCM. If program is successful, ERASE the DTC codes. If reflash fails, INSTALL a new mechatronic unit.
P0942	Hydraulic Pressure Unit	Stuck Limp Home Mode Value	Fault detected in hydraulic valve body.	• Harsh or erratic shift engagements. • No torque converter clutch apply. • No REVERSE. • No DRIVE. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit. If transmission fluid is contaminated, INSTALL a new transaxle.

Diagnostic Trouble Code Chart (Part 14)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0657	Actuator Supply Voltage Circuit A	Actuator Supply Voltage Circuit A Open	High side driver error detected during initialization of the TCM. Short to ground or open.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
P0658	Actuator Supply Voltage Circuit A	Actuator Supply Voltage Circuit A Low	High side error detected during initialization of the TCM.	• Engagement concerns. Harsh/erratic. • No torque converter lock-up. • Lack/loss of power/acceleration. • Different ratio behavior (increased engine rpm). • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 14)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0659	Actuator Supply Voltage Circuit A	Actuator Supply Voltage Circuit A High	High side driver error detected during initialization of the TCM. Short to power.	• Lack/loss of power/acceleration. • Vehicle not drivable. • Will turn on driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.
U0073	TCM	Transmission Control Module Communication Error	Loss of communication with the TCM.	• Engine driveability concerns. • Will turn on MIL and driver warning lamp.	REFER to Computers and Control Systems.
U0101	TCM/PCM	Transmission Control Module Communication Error	PCM lost communication with the TCM.	• Engine driveability concerns. • Will turn on MIL and driver warning lamp.	**NOTE:** The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. INSTALL a new mechatronic unit.

Diagnostic Trouble Code Chart (Part 16)

Diagnostic Trouble Code Chart (Continued)

Five Digit DTC	Component	Description	Condition	Symptom	Action
P2544	PCM	Torque management request input signal A	Data received from the PCM or engine components are not correct for the vehicle operating conditions. Incorrect engine torque calculation may result.	Transmission may enable limp-home strategies or increase pressures. Engine components and PCM may or may not set additional DTCs. P2544, fuel monitor error, ECT sensor failure and MAF sensor failures may be present. MIL may illuminate.	REFER to Computers and Control Systems.
U0401	PCM/TCM	Invalid data received from the PCM or engine components	Data received from the PCM or engine components is not correct for the vehicle operating conditions.	Transmission may enable limp-home strategies or increase pressures Engine components and PCM may or may not set additional DTCs. P2544, fuel monitor error, ECT sensor failure and MAF sensor failures may be present. MIL may illuminate.	REFER to Computers and Control Systems.

Diagnostic Trouble Code Chart (Part 17)

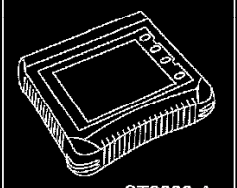
Worldwide Diagnostic System (WDS)

When following powertrain diagnostics for OBD II vehicles, the system may be checked by an off-board tester referred to as a diagnostic tool. This section contains information for carrying out diagnostics with a diagnostic tool. A diagnostic tool has certain generic capabilities that are standard across the automotive industry in the United States. All functions are selected from a menu. Refer to the instruction manual provided by the tool manufacturer.

Pinpoint Tests - Non OSC Equipped Vehicles

Pinpoint Tests - Non OSC Equipped Vehicles

Special Tool(s)

 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool
 ST1137-A	73 III Automotive Meter 105-R0057 or equivalent

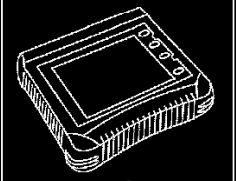
Special Tool(s)

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

Prior to carrying out the pinpoint tests check:
^ Transmission fluid level
^ Transmission fluid condition (burned, metal particles or discolored)
^ Engine cooling system
^ Other non-related transaxle DTC

Test A: Transmission Fluid Pressure Sensors

Pinpoint Tests - Non OSC Equipped Vehicles

Special Tool(s)	
 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool
 ST1137-A	73 III Automotive Meter 105-R0057 or equivalent

Special Tool(s)

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

Prior to carrying out the pinpoint tests check:
^ Transmission fluid level
^ Transmission fluid condition (burned, metal particles or discolored)
^ Engine cooling system
^ Other non-related transaxle DTC

Pinpoint Test A: Transmission Fluid Pressure Sensors

PINPOINT TEST A: TRANSMISSION FLUID PRESSURE SENSORS

NOTE: An internal fluid leak, incorrectly installed transmission fluid pan filter, cut/damaged mechatronic assembly feed tube O-rings or a transmission fluid pump leaking or not operating correctly can cause a difference in the pressure readings. Always check the fluid pan filter for correct installation, the mechatronic assembly bolt torque for correct torque setting, O-rings and feed tubes for damage and leaks, and the fluid pump for correct operation prior to installing a new or the original mechatronic assembly. If the feed tubes, O-rings or fluid pan filter are damaged or if the fluid pump is not operating correctly, install new components as required. Recheck the pressures using the pinpoint test. If the pressure readings are still incorrect, install a new mechatronic assembly.

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
A1	**PRESSURE SENSOR DIAGNOSTICS**	
	• Key in OFF position. • Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding. • Connect the diagnostic tool. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure Sensor (PCC__MES). • **Are the pressure sensor readings between 0-80 kPa (0-12 psi)?**	**Yes** Pressure sensors are OK. GO to **A2**. **No** Pressure sensors are faulty. REPLACE mechatronic.
A2	**CHECK PRESSURE AT IDLE**	
	• Key in START position. • Engine speed at idle. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Engine Speed (RPMTCM), Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • Monitor and record the PIDs. • **Are the presssure sensor readings less than 300 kPa (44 psi)?**	**Yes** CHECK pan filter for restriction or for correct installation. If pan filter is installed correctly and not restricted, INSTALL a new fluid pump. REFER to the notes preceding this pinpoint test. **No** GO to **A3**.
A3	**CHECK PRESSURE AT IDLE**	
	• Enter the following diagnostic mode on the diagnostic tool: PIDs: Engine Speed (RPMTCM), Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • Monitor and record the PIDs. • **Is the main pressure sensor less than the pulley 2 (secondary) sensor pressure?**	**Yes** GO to **A4**. **No** GO to **A5**.
A4	**CHECK PRESSURE AT IDLE**	
	• Enter the following diagnostic mode on the diagnostic tool: PIDs: Engine Speed (RPMTCM), Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • **NOTE:** If the main pressure is less than the pulley 2 pressure the difference cannot be greater than 400 kPa (58 psi). Monitor and record the PIDs. • **Is the difference between the main pressure sensor and the pulley 2 (secondary pressure sensor) less than 400 kPa (58 psi)?**	**Yes** GO to **A5**. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)
A5	**CHECK PRESSURE OFF IDLE**	
	• Engine speed above 2,000 rpm. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • Monitor and record the PIDs. • **Is the main and pulley 2 pressures greater than 300 kPa (44 psi)?**	**Yes** GO to **A6**. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)

(Continued)

PINPOINT TEST A: TRANSMISSION FLUID PRESSURE SENSORS (Continued)

Test Step		Result / Action to Take
A6	CHECK PRESSURE OFF IDLE	
	• Engine speed above 2,000 rpm. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Engine Speed (RPMTCM), Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • Monitor and record the PIDs. • **Is the main pressure less than the pulley 2 pressure?**	**Yes** GO to **A7**. **No** GO to **A8**.
A7	CHECK PRESSURE OFF IDLE	
	• Engine speed above 2,000 rpm. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Engine Speed (RPMTCM), Main Pressure Sensor (PCA__MES) and Pulley 2 Pressure (secondary) Sensor (PCC__MES). • **NOTE:** If the main pressure is less than the pulley 2 pressure the difference cannot be greater than 400 kPa (58 psi). Monitor and record the PIDs. • **Is the difference between the main pressure and the pulley 2 pressure less than 400 kPa (58 psi)?**	**Yes** GO to **A8**. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)
A8	CHECK MAIN PRESSURE DURING TEST DRIVE	
	• Drive the vehicle and monitor the diagnostic tool. • Engine RPM should be above 2,100. • Compare the difference between PIDs: (PCA__MES) and (PCC__MES). • **Is the difference between PIDs: (PCA__MES) and (PCC__MES) less than 300 kPa (44 psi)?**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. **No** INSTALL a new transaxle.

A6-A8

PINPOINT TEST B: TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
B1	ELECTRONIC DIAGNOSTICS	
	• Connect the diagnostic tool. • Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PIDs: Diagnostic Data Link, TFT. • **Does the vehicle enter TFT PID?**	**Yes** GO to **B2**. **No** REPEAT procedure to enter PID. If vehicle did not enter PID, REFER to Computers and Control Systems.
B2	TEMPERATURE SIGNAL CHECK	
	• Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: TFT. • Monitor the TFT PID. The temperature value should be within -55°C to 175°C (-65°F to 347°F). • **Is the TFT voltage within specified range?**	**Yes** GO to **B3**. **No** INSTALL a new mechatronic assembly.
B3	WARM-UP/COOL-DOWN CYCLE	
	• While monitoring PID: TFT, carry out the following test: If transaxle is cold, run transaxle to warm it up. If transaxle is warm, allow transaxle to cool down. • **Does the TFT PIDs increase as the transaxle is warmed up or decrease as the transaxle is cooled.**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. If concern is still present or reappears, INSTALL a new mechatronic assembly. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)

B1-B3

PINPOINT TEST C: TRANSMISSION RANGE (TR) SENSOR

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
C1	VERIFY RANGE SELECTOR LEVER	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding. • Connect the diagnostic tool. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PID: TR. • Move the range selector throughout all the gear ranges. • **Does the PID TR match all the selected gears?**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. **No** ADJUST the shift cable CLEAR the DTCs code. If the DTC code reappears it is internal to the transaxle. REFER to Transmission Range (TR) Sensor

C1

PINPOINT TEST D: TORQUE CONVERTER CLUTCH

Test Step		Result / Action to Take
D1	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in the connector and in good condition before proceeding. • Connect the diagnostic tool. • Drive the vehicle with a steady speed up to and above 24 km/h (15 mph). • Monitor PID: (PCE/TCC). • The TCC commanded pressure should be greater than 400 kPa (44 psi) and the turbine shaft speed should be equal to engine speed. • **Is the lockup commanded pressure greater than 400 kPa (44 psi) and the turbine speed equal to engine speed?**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. **No** INSTALL a new torque converter.

D1

PINPOINT TEST E: EXCESSIVE CLUTCH SLIPPAGE

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
E1	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in the connector and in good condition before proceeding. • Connect the diagnostic tool. • With the vehicle in DRIVE and REVERSE at idle, monitor PIDs. (CLTAMP__MES) actual current for forward/reverse clutch solenoid and (CLTAMP__CMD) for commanded current forward/reverse clutch solenoid. • **Is the current value between both PIDS no greater than 10 milliampere?**	**Yes** GO to **E2**. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)
E2	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in the connector and in good condition before proceeding. • Connect the diagnostic tool. • With the vehicle in DRIVE and REVERSE at idle, monitor PIDs. (TR) (TSS__SRC), Pulley A (SPD__PULA) Speed. • The turbine shaft speed should be equal to Pulley A (primary) Speed. • **Is the turbine speed equal to pulley A (primary) speed?**	**Yes** GO to **E3**. **No** REFER to Diagnosis By Symptom

(Continued)

E1-E2

PINPOINT TEST E: EXCESSIVE CLUTCH SLIPPAGE (Continued)

Test Step		Result / Action to Take
E3	ELECTRONIC DIAGNOSTICS	
	• Connect the diagnostic tool. • With the vehicle in NEUTRAL and PARK at idle, monitor PIDs. (TR), (TSS__SRC), Pulley A (SPD__PULA) Speed. • The turbine shaft speed should be equal to engine speed, and pulley A (primary) speed should be at zero. • **Is the turbine speed equal to engine speed, and pulley A (primary) speed at zero?**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. **No** REFER to Diagnosis By Symptom

E3

PINPOINT TEST F: OUTPUT SHAFT SPEED (OSS) SENSORS

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
F1	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding. • Connect the diagnostic tool. • Key in START position. • Enter the following diagnostic mode on the diagnostic tool: OSS__SRC (OSSA), OSSB. • Monitor and record speed. • **Do OSS A and OSS B equal each other?**	**Yes** GO to **F2**. **No** INSTALL a new OSS sensor.
F2	ELECTRONIC DIAGNOSTICS	
	• Enter the following diagnostic mode on the diagnostic tool: OSS__SRC (OSSA), OSSB. • Drive the vehicle and monitor and record speed. • Both the OSS A and OSS B should read the same. • **Do OSS A and OSS B follow the vehicle speed and read the same?**	**Yes** CLEAR all DTCs. ROAD TEST to verify if concern is still present. Concern could be intermittent. If concern is still present or reappears, INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.) **No** INSTALL a new OSS sensor.

F1-F2

PINPOINT TEST G: TURBINE SHAFT SPEED (TSS) SENSOR

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
G1	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in the connector and in good condition before proceeding. • Connect the diagnostic tool. • Key in ON position. • Key in START position. • With the vehicle in NEUTRAL and PARK at idle, monitor PIDs. (TR), (TSS__SRC), Pulley A (SPD__PULA) Speed and (RPMTCM). • The turbine shaft speed should be equal to engine speed, and pulley A (primary) speed should be at zero. • **Is the turbine speed equal to engine speed, and pulley A (primary) speed at zero?**	**Yes** System functionally correctly. Intermittent fault. **No** GO to **G2**.
G2	ELECTRONIC DIAGNOSTICS	
	• With the vehicle in DRIVE and REVERSE at idle, monitor PIDs. (TR), (TSS__SRC), Pulley A (SPD__PULA) Speed and (RPMTCM). • The turbine shaft speed should be equal to Pulley A (primary) speed. • **Is the turbine speed equal to pulley A (primary) speed?**	**Yes** System functionally correctly. **No** INSTALL a new mechatronic assembly. (Refer to the note preceding this pinpoint test.)

G1-G2

PINPOINT TEST H: TRANSMISSION CONTROL MODULE SIGNAL

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

Test Step		Result / Action to Take
H1	TRANSMISSION CONTROL MODULE SIGNAL OUT OF RANGE	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in connector and in good condition before proceeding. • Connect the diagnostic tool. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PID: Ignition Voltage (D10B). • **Is the ignition voltage between 11 and 15 volts.**	**Yes** GO to **H2**. **No** REPAIR the open or short circuit harness side.
H2	TRANSMISSION CONTROL MODULE SIGNAL OUT OF RANGE	
	• Connect the diagnostic tool. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PID: VPWRTCM. • **Is the operating voltage between 11 and 15 volts.**	**Yes** System operating correctly. **No** Fix other DTCs first. Charge the vehicle battery.

H1-H2

PINPOINT TEST I: PRIMARY PULLEY SPEED SENSOR

NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available.

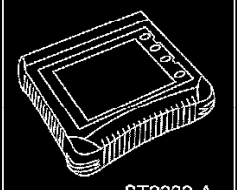
Test Step		Result / Action to Take
I1	ELECTRONIC DIAGNOSTICS	
	• Check to make sure the transaxle harness connector is fully seated, pins are fully engaged in the connector and in good condition before proceeding. • Connect the diagnostic tool. • With the vehicle in NEUTRAL and PARK at idle, monitor PIDs. (TR), (TSS__SRC), Pulley A (SPD__PULA) speed and (RPMTCM) engine speed. • The pulley A (primary) speed should be at zero. • **Is the pulley A (primary) speed at zero?**	**Yes** GO to **I2**. **No** INSTALL a new mechatronic unit. (Refer to the note preceding this pinpoint test.)
I2	ELECTRONIC DIAGNOSTICS	
	• With the vehicle in DRIVE and REVERSE at idle, monitor PIDs. (TR), (TSS__SRC), Pulley A (SPD__PULA) speed and (RPMTCM) engine speed. • The turbine shaft speed should be equal to Pulley A (primary) speed. • **Is the turbine speed equal to pulley A (primary) speed?**	**Yes** System functionally correctly. **No** INSTALL a new mechatronic unit. (Refer to the note preceding this pinpoint test.)

I1-I2

Component Tests

Torque Converter Diagnosis

Special Tool(s)

 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool

Special Tool(s)

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

Begin with the normal diagnostic procedures:

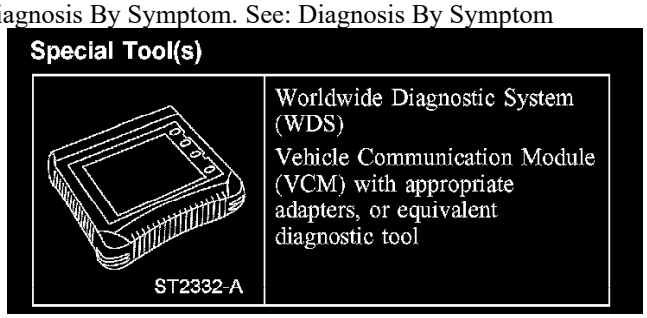
1. Preliminary Inspection

2. Know and Understand the Customer's Concern
3. Verify the Concern - carry out the torque converter operation test.
4. Carry out Diagnostic Procedures:
   ^ Run on-board diagnostics.
   - Repair all non-transaxle-related DTCs first.
   - Repair all transaxle DTCs.
   - Rerun On-Board Diagnostic to verify repair.
   - Carry out diagnostic routines. Refer to Diagnosis By Symptom. See: Diagnosis By Symptom
   - Use the index 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 repairing the torque converter.

Torque Converter Operation Test

NOTE: The torque converter clutch will not engage if the transmission fluid temperature is **below 0°C (32°F).**

1. Using the special tool, make sure that the transmission fluid temperature is within specification **43°C-47°C (109°F - 117°F).**
2. Accelerate the vehicle to **35 - 60 km/h (22 - 37 mph)** and maintain a consistent speed.
3. Release the accelerator pedal to close the throttle and press the accelerator to partially open the throttle while monitoring the special tool engine speed and TCC PID 194D. The TCC PID on the special will read 0 when the TCC clutch is released, and 1 when the TCC is applied. The engine speed will increase when the TCC is released and decrease when the TCC is applied.
4. If these actions do not occur, refer to Diagnosis By Symptom. See: Diagnosis By Symptom



Special Tool(s)

Diagnostic PID Chart

PID No.	PID Name	Description	Units	Ford Definition	Associated DTCs
496B	APP__NORM	Accelerator Position Sensor Normalized	PERCENTAGE	Accelerator Position Sensor	
IF	AST	Time Since Start Seconds	INT	Time Since Start Seconds	
2900	BRKPEDSW	Brake Pedal Switch	INT	Brake Pedal Position Switch	
31	CLRDIST	Distance Since Diagnostic Trouble Codes Cleared	MILEAGE	Distance Since TCM Diagnostic Trouble Codes Cleared	
30	CLRWRMUP	Number of Warm-Ups Since DTCs Cleared	INT	Number of Warm-Ups Since DTCs Cleared	
1955	CLTAMP__CMP	Commanded Current for Clutch Actuator	CURRENT	Forward Clutch/Reverse Clutch Solenoid	900, 902, 903
1953	VAR__CMD	Commanded Variator Ratio Input Speed/Output Speed	RATIO	Commanded Variator Ratio Input/Output Speed	730
101	DRIVECNT	Valid Drive Counter	INT	Valid Drive Counter	
200	DTC TCM	Number of Continuous Codes Set	INT	Number of Continuous Codes Set	
5	ECT TCM	ECT (Engine Coolant Temperature)	TEMPERATURE	ECT (Engine Coolant Temperature)	
4	ENGLOAD	Engine Load — Calculated	PERCENTAGE	Engine Load	
194C	PCAAMP__MES	Measured Current PCA	CURRENT	Main Pressure Solenoid	960, 961, 962, 963
194E	PCBAMP__MES	Measured Current for PCB	CURRENT	Primary Pulley Pressure Solenoid	964, 966, 967
194F	PCCAMP__MES	Measured Current for the PCC	CURRENT	Secondary Pulley Pressure Solenoid	968, 970, 971
194D	TCCAMP__MES	Measure Current for the TCC Pressure Control	CURRENT	Torque Converter Clutch Solenoid	740, 741, 742, 743

Diagnostic PID Chart (Part 1)

Diagnostic PID Chart (Continued)

PID No.	PID Name	Description	Units	Ford Definition	Associated DTCs
1950	CLTAMP__MES	Measured Current Clutch Actuator	CURRENT	Forward Clutch/Reverse Clutch Solenoid	900, 902, 903
1952	PCA__MES	Measured Pressure of PCA	PRESSURE	Main Pressure Solenoid	960, 961, 962, 963
1951	PCC__MES	Measure Pressure of PCC	PRESSURE	Secondary Pulley Pressure Solenoid	968, 970, 971
1956	VAR__MES	Measured Variator Ratio Input Speed/Output Speed	RATIO	Measure Variator Radio Input/Output Speed	
21	MIL__DIS	The Distance Travelled Since the MIL Was Activated	MILEAGE (Km)	The Distance Travelled Since the MIL Was Activated	
6180	ODOMETER	Total Distance	MILEAGE (Km)	Total Distance	
949	OSS__SRC	Output Shaft Speed A	RPM	Secondary Pulley Pressure Sensor	720, 721
194B	OSS__B	Output Shaft Speed B	RPM	Directional OSS Sensor	720, 721
90F	PCA	Pressure Control Solenoid A — Commanded	PRESSURE	Main Pressure Solenoid	960, 961, 962, 963
90B	PCA__AMP	Pressure Control Solenoid A — Commanded	CURRENT	Main Pressure Solenoid	960, 961, 962, 963
910	PCB	Pressure Control Solenoid B — Commanded	PRESSURE	Primary Pulley Pressure Solenoid	964, 966, 967
90C	PCM__AMP	Pressure Control Solenoid B — Commanded	CURRENT	Primary Pulley Pressure Solenoid	964, 966, 967
911	PCC	Pressure Control Solenoid C — Commanded	PRESSURE	Secondary Pulley Pressure Solenoid	968, 970, 971
90D	PCC__AMP	Pressure Control Solenoid C — Commanded	CURRENT	Secondary Pulley Pressure Solenoid	968, 970, 971
912	PCD	Shift Pressure Control Solenoid D	PRESSURE	Forward Clutch/Reverse Clutch Solenoid	900, 902, 903
9AD	SSPC__E	Shift PSI Control Solenoid E or TCC	PRESSURE	Torque Converter Clutch Solenoid	740, 741, 742, 743
1165	RPM TCM	Engine Revolutions Per Minute	RPM	Engine RPM	1270
9969	VOLT__SNSR	Sensor Supply Voltage	VOLTAGE	Sensor Supply Voltage	
1949	SPD__PULA	Speed Pulley A Actual Sensor Reading	RPM	Primary Pulley A Speed	2765, 2766
194A	SPD__PULB	Speed Pulley B Actual Sensor Reading	RPM	Secondary Pulley B Speed	871

Diagnostic PID Chart (Part 2)

Diagnostic PID Chart (Continued)

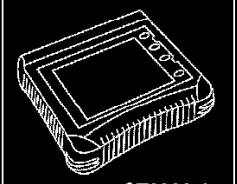
PID No.	PID Name	Description	Units	Ford Definition	Associated DTCs
1912	TR	Transmission Actual Gear (PRNDL)	INT (PRNDL)	Transmission Range Sensor	706
9CA	TCC__AMP	Torque Converter Pressure Control — Commanded	CURRENT	Torque Converter Clutch Solenoid	740, 741, 742, 743
1104	TCIL	Transmission Control Indicator Light	INT	Transmission Control Indicator Light	—
1674	TFT	Transmission Fluid Temperature	TEMPERATURE (F)	Transmission Fluid Temperature	218, 710, 711, 714
1400	TORQUE	Net Engine Torque	TORQUE (Nm)	Net Engine Torque	—
11	TP	Throttle Position	PERCENTAGE	Throttle Position	—
94A	TSS__SRC	Turbine Shaft Speed	RPM	Turbine Shaft Speed (Actual Speed)	715, 716
9953	VPWR TCM	Module Supply Voltage	VOLTAGE	TCM Supply Voltage	—
11C1	VSS__TCM__2	Vehicle Speed — High Resolution	SPEED (mph)	Odometer Vehicle Speed	—
D10B	IV	Ignition Voltage	VOLTAGE	Key on Battery Voltage	562, 563

Diagnostic PID Chart (Part 3)

Diagnosis By Symptom

Diagnosis By Symptom

Special Tool(s)

 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool
 ST1137-A	73 III Automotive Meter 105-R0057 or equivalent

Special Tool(s)

The Diagnosis by Symptom charts give the technician diagnostic information, direction, and suggest possible components, using a symptom as a starting point.
The Routines list the possible hydraulic or mechanical components that could cause or contribute to the symptom described.

Diagnosis by Symptom Chart Directions

NOTE: When the diagnostic system detects a fault specific to this transmission, a transmission related Diagnostic Trouble Code (DTC will be set. The wrench light on the dash may illuminate. Care must be taken when diagnosing DTCs when other non-transmission related DTCs set. As with any transmission diagnostics, all non-related transmission DTCs must be addressed prior to diagnosing transmission DTCs. The wrench light will also illuminate for faults detected in the Anti-lock Brake System (ABS) or Electronic Throttle Control (ETC) system.

1. Using the Symptom Index, select the concern/symptom that best describes the condition.
2. See 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 carry out other test procedures as directed.

4. **NOTE:** Not all concerns and conditions with electrical components will set a diagnostic trouble code (DTC). Be aware that the components listed may still be the cause. Verify correct function of these components prior to proceeding to the routine listed.

   Begin with the routine indicated. Follow the reference or action required statements. Always carry out the on-board diagnostic tests as required. Never skip steps. Repair as required. These components are listed in the removal sequence and by most probable cause. All components listed must be inspected to make sure of correct repair.

Diagnosis by Symptom Index

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

Diagnosis by Symptom Index (Part 1)

Title	Routines
Delayed/Soft Reverse	205
Delayed/Soft Forward	206
No Forward and No Reverse	207
Torque Converter Operation Concerns	
Torque Converter: No Apply	240
Torque Converter: Cycling/Shudder/Chatter	242
Other Concerns	
Shift Lever Efforts High	251
External Leaks	252
Noise/Vibration — Forward or Reverse	254
No Park Range	256
Overheating	257

Diagnosis by Symptom Index (Part 2)

201, No Forward

Engagement Concern: No Forward

Engagement Concern: No Forward

Possible Component	Reference/Action
201 — ROUTINE	
Shift Linkage	
• Damaged or out of adjustment	• Inspect and repair as required. Verify linkage adjustment.
Incorrect Pressures	
• Forward clutch pressure	• Check pressure PIDs. — Main Control
• Primary variator cover — seals damaged or missing	• Inspect. Repair as required.
• Transmission range sensor	• Transmission range sensor feed tube.
Forward Clutch Assembly	
• Seals, Piston — damaged	• Install new components as necessary
• Fluid Tubes and Seals — worn, damaged, loose, leaking	• Inspect. Install new as required.
• Friction Elements — damaged, clearance check incorrect	• Inspect. Repair as required.
• Wave Spring — damaged, missing	• Inspect. Repair as required.

Engagement Concern: No Forward

202, No Reverse

Engagement Concern: No Reverse

Engagement Concern: No Reverse

Possible Component	Reference/Action
202 — ROUTINE	
Shift Linkage	
• Damaged or out of adjustment	• Inspect and repair as required. Verify linkage adjustment.
Incorrect Pressures	

Engagement Concern: No Reverse (Part 1)

Engagement Concern: No Reverse (Continued)

Possible Component	Reference/Action
• Reverse clutch pressure	• Check pressure PIDs. — Reverse Clutch Assembly
• Primary variator cover — seals damaged or missing	• Inspect. Repair as required.
• Transmission range sensor	• Transmission range sensor feed tube.
Reverse Clutch Assembly	
• Seals, Piston, Springs — damaged	• Inspect for damage. Repair as required.
• Clearance check out of specification	• Inspect. Carry out clearance checks.
• Friction Elements — damaged or worn	• Inspect for damage. Repair as required.

Engagement Concern: No Reverse (Part 2)

203, Harsh Reverse

Engagement Concern: Harsh Reverse

Engagement Concern: Harsh Reverse

Possible Component	Reference/Action
203 — ROUTINE	
Reverse Clutch Assembly	
• Piston — damaged, stuck	• Inspect for damage. Repair as required.
• Friction Elements — damaged, worn	• Inspect for damage. Repair as required.
• Return Spring — damaged, worn, stuck	• Inspect for damage. Repair as required.
• Wave Spring — damaged	• Inspect for damage. Repair as required.
• Fluid Tubes and Seals — worn, damaged, loose, leaking	• Inspect. Install new as required.
• Low fluid level	• Adjust the fluid to the correct level. Use the transmission fluid level setting procedure, refer to Transmission Fluid Level Check and Setting
• Select shift assembly not plugged in or damaged	• Inspect for damage or not connected. Repair as required.

Engagement Concern: Harsh Reverse

204, Harsh Forward

Engagement Concern: Harsh Forward

Engagement Concern: Harsh Forward

Possible Component	Reference/Action
204 — ROUTINE	
Forward Clutch Assembly	
• Piston — damaged, stuck	• Inspect for damage. Repair as required.
• Friction Elements — damaged, worn	• Inspect for damage. Repair as required.
• Return Spring — damaged, worn, stuck	• Inspect for damage. Repair as required.
• Wave Spring — damaged	• Inspect for damage. Repair as required.
• Fluid Tubes and Seals — worn, damaged, loose, leaking	• Inspect. Install new as required.
• Low fluid level	• Adjust the fluid to the correct level. Use the transmission fluid level setting procedure, refer to Transmission Fluid Level Check and Setting
• Select shift assembly not plugged in or damaged	• Inspect for damage or not connected. Repair as required.

Engagement Concern: Harsh Forward

205, Delayed/Soft Reverse

Engagement Concern: Delayed/Soft Reverse

Engagement Concern: Delayed/Soft Reverse

Possible Component	Reference/Action
205 — ROUTINE	
Reverse Clutch Assembly	
• Seals, Piston — worn, damaged	• Inspect for damage. Repair as required.
• Wave Spring — damaged	• Inspect for damage. Repair as required.
• Friction Elements — damaged or worn	• Inspect for damage. Repair as required.
• Return Spring — damaged or worn	• Inspect for damage. Repair as required.
• Fluid Tubes and Seals — worn, damaged, loose, leaking	• Inspect. Install new as required.

206, Delayed/Soft Forward

Engagement Concern: Delayed/Soft Forward

Engagement Concern: Delayed/Soft Forward	
Possible Component	**Reference/Action**
206 — ROUTINE	
Forward Clutch Assembly	
• Seals, Piston — worn, damaged	• Inspect for damage. Repair as required.
• Wave Spring — damaged	• Inspect for damage. Repair as required.
• Friction Elements — damaged or worn	• Inspect for damage. Repair as required.
• Return Spring — damaged or worn	• Inspect for damage. Repair as required.
• Fluid Tubes and Seals — worn, damaged, loose, leaking	• Inspect. Install new as required.

Engagement Concern: Delayed/Soft Forward

207, No Forward and No Reverse

Engagement Concern: No Forward and No Reverse

Engagement Concern: No Forward and No Reverse	
Possible Component	**Reference/Action**
207 — ROUTINE	
Fluid	
• Incorrect fluid level (low)	• Adjust fluid to correct level.
Halfshaft	
• Splines — worn, damaged	• Inspect for damage. Repair as required.
• Shaft — misassembled, incorrect	
Shift Linkage	
• Damaged or out of adjustment	• Inspect and repair as required. Verify linkage adjustment.
NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. **Transmission Range Sensor**	
• Incorrectly installed	• Bolts loose. Tighten to specification
• Seals damaged, missing, installed incorrectly	• Inspect. Repair as required.
• Fluid Tubes and Seals between the TR and the mechatronic assembly — worn, damaged, loose, leaking	• Inspect. Install new as required.

Engagement Concern: No Forward and No Reverse (Part 1)

Engagement Concern: No Forward and No Reverse (Continued)

Possible Component	Reference/Action
• Transmission Range Sensor — damaged, installed incorrectly	• Inspect. Repair as required.
• Transmission Range Sensor — Electrical connector at the mechatronic assembly — damaged, installed incorrectly, not connected	• Inspect. Repair as required.
NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. **Incorrect Pressures**	
• Low pressure	• Check pressure PIDs. If pressures are low, check the following possible components: fluid filter, mechatronic assembly and seals between mechatronic and TR assembly.
• Fluid Tubes and Seals between the TR and the mechatronic assembly — worn, damaged, loose, leaking	• Inspect. Install new as required.
Fluid Filter Assembly	
• Plugged, damaged	• Install a new filter and seal assembly
NOTE: The transmission control module (TCM) is integrated into the mechatronic assembly. If installing a new transaxle or a mechatronic assembly, the TCM will need to be checked and recalibrated (reflashed) to the latest level calibration available. **Mechatronic Assembly**	
• Bolts out of torque specification	• Check bolt specification.
• PC solenoid E — Not functioning	• Install a new mechatronic
• Fluid tubes and seals between the TR and the mechatronic assembly — worn, damaged, loose, leaking	• Inspect. Install new as required.
• Transmission Range Sensor — Electrical connector at the mechatronic assembly — damaged, installed incorrectly, not connected	• Inspect. Repair as required.
Other Possible Components	
• Chain and Variator assembly	• Inspect for damage. Repair as required.
• Final Drive Assembly	• Inspect for damage. Repair as required.
• Pump Assembly	• Inspect for damage. Repair as required.

Engagement Concern: No Forward and No Reverse (Part 2)

240, No Apply

Torque Converter Operation Concerns: No Apply

Torque Converter Operation Concerns: No Apply

Possible Component	Reference/Action
240 — ROUTINE	
Incorrect Pressures • Low pressure	• Check pressure PIDs. If low, check main control valve body.
Mechatronic Assembly	

Torque Converter Operation Concerns: No Apply (Part 1)

Torque Converter Operation Concerns: No Apply (Continued)

Possible Component	Reference/Action
• Bolts out of torque specification	• Check bolt specification.
• PC solenoid B — damaged, not functioning	• GO to Pinpoint Test E.
• Torque converter clutch seal — damaged	• Inspect for damage. Repair as required.

Torque Converter Operation Concerns: No Apply (Part 2)

242, Cycling/Shudder/Chatter

Torque Converter Operation Concern: Cycling/Shudder/Chatter

Torque Converter Operation Concern: Cycling/Shudder/Chatter

Possible Component	Reference/Action
242 — ROUTINE	
Fluid	
• Fluid condition	• Inspect fluid condition. If burnt, drain fluid. Install new fluid and fluid filter assembly. Bring vehicle to normal operating temperature.
Incorrect Pressures	
• Low pressure	• Check pressure PIDs.
• Torque converter clutch seal — damaged	• Inspect for damage. Repair as required.

Torque Converter Operation Concern: Cycling/Shudder/Chatter

251, Shift Lever Efforts High

Other Concerns: Shift Lever Efforts High

Other Concerns: Shift Lever Efforts High

Possible Component	Reference/Action
251 — ROUTINE	
Shift Linkage	
• Damaged or out of adjustment	• Inspect and repair as required. Verify linkage adjustment.
Manual Lever	
• TR manual valve assembly — damaged	• Inspect and repair as required.
• External Manual Lever — damaged or bent	• Inspect and repair or install new as required.
• Park Mechanism — bent, damaged	• Inspect. If damage is indicated, install a new transaxle.
Mechatronic Assembly	
• Bolts out of torque specification	• Check bolt specification.

Other Concerns: Shift Lever Efforts High

252, External Leaks

Other Concerns: External Leaks

Other Concerns: External Leaks

Possible Component	Reference/Action
252 — ROUTINE	
Fluid Level	
• Incorrect fluid level	• Adjust the fluid to the correct level. Use the transmission fluid level setting procedure, refer to Transmission Fluid Level Check and Setting
Seals, Gaskets	
• Leaks: Converter, Halfshaft Axles, Manual Lever Seal, Fluid Level Indicator Tube, Transmission Fluid Pan, Incorrect Hub Seal,	• Locate source of leak. Repair as required.
Other	

Other Concerns: External Leaks (Part 1)

Other Concerns: External Leaks (Continued)

Possible Component	Reference/Action
• Leaks: Cooler Fitting, Transmission Electrical Connector Housing, Cooler Tubes, Transmission Fluid Pan, Case Porosity, Case Cracked	• Locate source of leak. Repair as required.
• Vent — blocked damaged	• Check vent for damage or blockage. Repair as required.

Other Concerns: External Leaks (Part 2)

254, Noise/Vibration - Forward or Reverse

Other Concerns: Noise/Vibration - Forward or Reverse

Other Concerns: Noise/Vibration — Forward or Reverse

Possible Component	Reference/Action
254 — ROUTINE	
For Noises/Vibrations That Change With Engine Speed	
• Converter components	• Locate source of disturbance. Repair as required.
• Fluid level (low)	• Fluid cavitation.
• Pump — Noise	• Fluid level (low).
• Fluid Cooler Tubes — grounding out	• Locate source of disturbance. Repair as required.
• Flexplate	• Loose or cracked. Repair as required.
For Noises/Vibrations That Change With Vehicle Speed/Load	
• Gear noise	• Locate source of noise and repair as required.
• Engine Mounts — loose or damaged	• Locate source of disturbance and repair as required.
• Driveline concerns: — Halfshaft shudder — CV joints — Suspension — Modifications	
• Transaxle concerns: — Differential concerns — Bearings	
• Output/Halfshaft Splines — worn or damaged	• Locate source of disturbance and repair as required.

Other Concerns: Noise/Vibration - Forward or Reverse

256, No Park Range

Other Concerns: No Park Range

Other Concerns: No Park Range

Possible Component	Reference/Action
256 — ROUTINE	
Shift Linkage • Damaged or out of adjustment	• Inspect and repair as required. Verify linkage adjustment.
Park Mechanism • Park Pawl, Parking Pawl Return Spring, Park Rod, Parking Pawl Shaft, Manual Lever, Manual Lever Detent Spring — damaged	• Inspect and repair as required.

Other Concerns: No Park Range

257, Transaxle Overheating

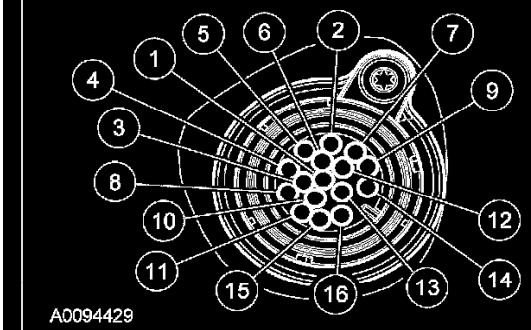
Other Concerns: Transaxle Overheating

Other Concerns: Transaxle Overheating

Possible Component	Reference/Action
257 — ROUTINE	
Fluid • Incorrect level	• Adjust fluid to correct level. Use the transmission fluid level setting procedure, refer to Transmission Fluid Level Check and Setting
• Condition	• Inspect fluid.
Thermal Bypass Valve • Thermal bypass valve — not functioning	• Install a new pressure filter bypass assembly.
Cooler Tubes • Damaged, blocked, reversed, leaking	• Inspect and repair as required.
Auxiliary Cooler • Damaged, blocked, restricted or incorrectly installed	• Inspect and repair as required.

Other Concerns: Transaxle Overheating

Transaxle Vehicle Harness Connector



Pin Number	Circuit Function
1	Not Used
2	Can Low
3	Diagnostic Interface (ISO K)

Transaxle Vehicle Harness Connector

Pin Number	Circuit Function
4	Not Used
5	Not Used
6	Can High
7	Not Used
8	Not Used
9	Switched Positive Key on ignition power
10	Starter Interlock
11	Not Used
12	Not Used
13	Ground (KI 31__1)
14	Battery Voltage (KL 30)
15	Not Used
16	Ground (KI 31__2)

Transaxle Vehicle Harness Connector