

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:

- See INTRODUCTION - GASOLINE article
- OASIS Messages
- Technical Service Bulletins (TSBs)
- Wiring Diagram

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'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 and OASIS messages 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-transmission codes first.
- Repair all transmission 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.

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

DIAGNOSTIC FLOW CHART

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

- 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.

DIAGNOSTIC FLOW CHART

Diagnostic Flow Chart		
1. Did you record any Diagnostic Trouble Codes (DTCs)?	Yes	<ul style="list-style-type: none"> • REPAIR all hard DTCs. FOLLOW the pinpoint tests. See <u>INTRODUCTION - GASOLINE</u> article first, then this article, then GO to Step 2.
	No	<ul style="list-style-type: none"> • REFER to <u>DIAGNOSIS BY SYMPTOM</u> then GO to Step 1.
#2) Are any continuous test memory codes present?	Yes	<ul style="list-style-type: none"> • CLEAR codes and CARRY OUT drive cycle test, then GO to Step 3.
	No	<ul style="list-style-type: none"> • GO to Step 1.
#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. See <u>INTRODUCTION - GASOLINE</u> article , then the information from this article, 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 quick test to verify that no DTCs are present. CLEAR memory codes.
	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) Is the concern repaired?	Yes	<ul style="list-style-type: none"> • CARRY OUT the final quick test to verify that no DTCs are present. CLEAR memory codes.
	No	<ul style="list-style-type: none"> • GET assistance from Technical

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 complaint 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 section 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 short circuit can cause engine misfiring. The torque converter clutch 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 temperatures
- Type of terrain
- Vehicle loaded/unloaded
- City/highway driving
- Upshifting
- Downshifting
- Coasting
- Engagement
- Noise/vibration - check for dependencies, either rpm dependent, vehicle speed dependent, shift dependent, gear dependent, range dependent or temperature dependent.

Check Fluid Level and Condition

Fluid Level Check

CAUTION: The vehicle should not be driven if the 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 fluid must cool down to obtain an accurate reading.

NOTE: The transmission fluid temperature must not be allowed to exceed 50°C (122°F) when checking the fluid level. The fluid temperature should be between 30°C-50°C (86°F-122°F) closer to 50°C (122°F) when checking the fluid level.

This vehicle is not equipped with a fluid level indicator. An incorrect level may affect the transmission operation and can result in transmission failure.

Under normal circumstances, the fluid level should not be checked during normal maintenance. If the transmission starts to slip, shifts slowly or shows signs of fluid leaking, the fluid level should be checked.

1. With the transmission in P (PARK), the engine at idle (600-750 rpm) and foot pressed on the brake, move the range selector lever through each gear and allow engagement of each gear. Place the transmission range selector lever in the P position.
2. With the engine idling (600-750 rpm) in PARK, position it on a hoist.
3. Remove the fluid fill plug located on the side of the transmission case.
4. Partially add fluid until fluid starts to come out. Wait until the fluid stops or just drips from the hole.
5. Install the fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

High Fluid Level

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

If an overfill reading is indicated, drain and refill the transmission.

Low Fluid Level

A low 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 Fluid

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

If fluid must be added, add fluid in 0.5 liter (1/2 quart) increments through the fluid fill plug. Do not overfill

the fluid. For fluid type, refer to **SPECIFICATIONS** .

Fluid Condition Check

1. Check the fluid level.
2. Remove the fluid fill plug and allow the fluid to drip onto a facial tissue and examine the stain.

NOTE: The transmission fluid could be 2 different colors. The factory fill fluid is clear. The replacement fluid is red.

3. Observe the color and the odor. The color under normal circumstances should be dark reddish or clear, 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 fluid contamination or transmission failure is confirmed by the sediment in the bottom of the fluid pan, the transmission must be disassembled and completely cleaned. This includes the torque converter and fluid cooler tubes. A new oil-to-air cooler must be installed.

SHIFT POINT ROAD TEST

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 transmission range selector lever in D6 position.
3. Apply minimum throttle and observe speeds at which upshift occurs and torque converter engages. Refer to the **SHIFT SPEEDS** chart.
4. With the transmission in D6, move the range selector lever into the D4 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 should disengage and then reapply.
6. With the transmission in D6 position and speed above 80 km/h (50 mph) and less than half throttle, move the transmission range selector lever from D6 position to manual 2 position and remove pressure from the accelerator pedal. The transmission should downshift into 2nd gear. With the vehicle remaining in manual 2 position, move the transmission range selector lever into 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 torque converter clutch 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.

SHIFT POINT ROAD TEST

Throttle Position	Shift	MPH	Km/H
Light Throttle TP Voltage	1-2	12	19
	2-3	19	30
1.25 Volts	3-4	26	42
	4-5	34	55
	5-6	44	71
Closed Throttle	6-5	39	63
	5-4	32	52
	4-3	21	34
	3-2	6	10
	2-1	2	3
WOT	1-2	26	42
WOT	2-3	53	85
	3-4	82	132

TORQUE CONVERTER DIAGNOSIS

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's concern.
3. Verify the condition - carry out the torque converter operation test.
4. Carry out diagnostic procedures.
 - Carry out on-board diagnostics; refer to **DIAGNOSTICS**.
 - Repair all non-transmission related DTCs first.
 - Repair all transmission DTCs.
 - Rerun on-board diagnostic to verify repair.
 - Carry out Stall Speed Test. Refer to **SPECIAL TESTING PROCEDURES**.
 - Carry out 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

This test verifies that the torque converter clutch control system and the torque converter are operating correctly.

1. Carry out Quick Test with diagnostic tool. See **INTRODUCTION - GASOLINE** article . Check for DTCs.

2. Connect a tachometer to the engine.
3. Bring the engine to normal operating temperature by driving the vehicle at highway speeds for approximately 15 minutes in D6 position.
4. After normal operating temperature is reached, maintain a constant speed of about 80 km/h (50 mph) and tap the brake pedal with the left foot.
5. Engine rpm should increase when the brake pedal is tapped and decrease about 5 seconds after the pedal is released. If this does not occur, see Torque Converter Operation Concerns refer to **DIAGNOSIS BY SYMPTOM**.
6. If the vehicle stalls in D6 or at idle with the vehicle at a stop, move the transmission range selector lever to the manual 1 position. If the vehicle stalls, see Torque Converter Operation Concerns refer to **DIAGNOSIS BY SYMPTOM**. If the vehicle does not stall in D6, refer to **DIAGNOSIS BY SYMPTOM**.

NOTE: **The following is a list of common vehicle concerns that have been misdiagnosed as torque converter clutch shudder. For diagnosis of the following items, refer to the appropriate sections of the workshop manual and see INTRODUCTION - GASOLINE article .**

- Spark plugs - check for cracks, high resistance or broken insulators
- Plug wires
- 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
- MAP/MAF sensor - incorrect air/fuel mixture
- HO2S sensor - 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

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:

- Electronic add-on items:
 - Air conditioning
 - 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 powertrain control module (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 linkage adjustments; refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** .

Shift Linkage Check

Check for a misadjustment in shift linkage by matching the detents in the transmission range selector lever with those of the manual lever in the transmission. If they match, the misadjustment is in the indicator. Do not adjust the shift linkage.

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 shift linkage adjustment.

Check TSBs and OASIS

Refer to all technical service bulletins (TSB) and OASIS messages that pertain to the transmission concern and follow the procedure as described.

Carry Out On-Board Diagnostics (KOEO, KOER)

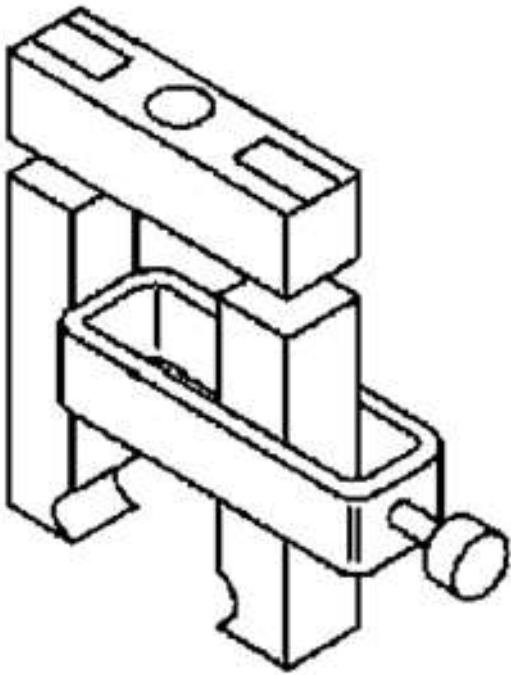
After a road test, with the vehicle warm and before disconnecting any connectors, carry out the Quick Test using the diagnostic tool. See **INTRODUCTION - GASOLINE** article .

DIAGNOSTICS

Special Tool(s)

DIAGNOSTICS - SPECIAL TOOL

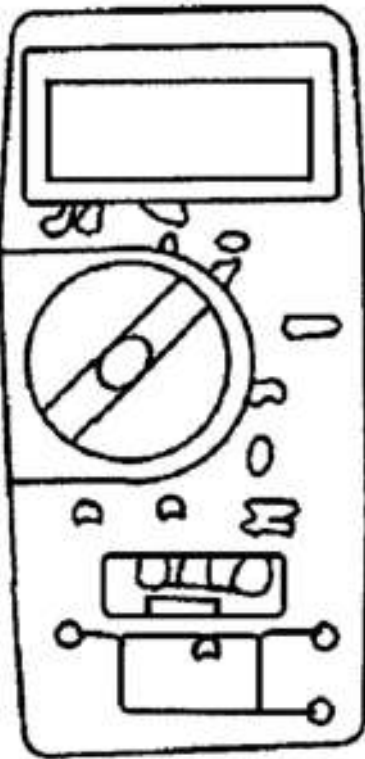
	<p>Transmission Fluid Pressure Gauge 307-004 (T57L-77820-A)</p>
--	---



ST1192-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

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 Diagnostics With Diagnostic Tool

NOTE: For detailed instruction and other diagnostic methods using the diagnostic tool. See **INTRODUCTION - GASOLINE** article and refer to the diagnostic tool tester manual . 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**
- **Quick Test 5.0 - Key On, Engine Running (KOER)**
 - Special Test Mode
 - Wiggle Test
 - Output Test Mode
 - PCM Reset Mode
 - Clearing DTCs
 - OBD II Drive Cycle
- **Other Diagnostic Tool Features**

For additional information on other diagnostic testing features using the diagnostic tool, See **INTRODUCTION - GASOLINE** article . Other diagnostic methods include the following:

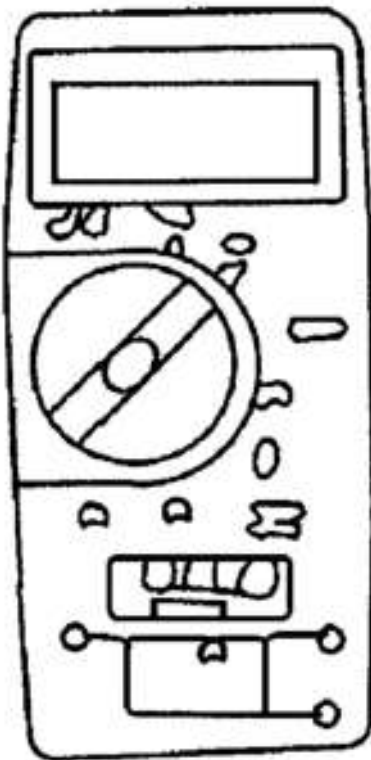
- Parameter Identification (PID) Access Mode
- Freeze Frame Data Access Mode
- Oxygen Sensor Monitor Mode

DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART

Special Tool(s)

PARAMETERS IDENTIFICATION - SPECIAL TOOL

	<p>Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool</p>
--	---



ST1137-A

Diagnostic PID Chart

DIAGNOSTIC PID CHART

PID No.	PID Name	Units
ECT	Engine coolant temperature	Degrees
VSS	Vehicle speed sensor - low resolution	MPH
TP	Absolute throttle position sensor	Percent full throttle
VBAT	VPWR: Control module voltage	Volts
APP_A	APP_D: Accelerator pedal position D	Percent
SSA_AMP	Commanded current for shift solenoid A	Amperes
SSB_AMP	Commanded current for shift solenoid B	Amperes
SSC_AMP	Commanded current for shift solenoid C	Amperes
SSD_AMP	Commanded current for shift solenoid D	Amperes
PCA_AMP	Commanded current for pressure control A	Amperes
TCC_AMP	Commanded current for torque converter clutch pressure control	Amperes
SSE_DC	Shift solenoid E duty cycle	Percent
RPM	Engine speed	RPM
VBAT	Battery voltage	Volts

GEAR	Gear commanded (1, 2, 3, 4, 5 and 6)	1, 2, 3, 4, 5 and 6
TCCMACT	Absolute value of slip across torque converter	RPM
RAT__CMD	Current transmission gear ratio commanded	1, 2, 3, 4, 5 and 6
RAT__MES	Current transmission gear ratio measured (input speed/output speed)	1, 2, 3, 4, 5 and 6
TFT	Transmission fluid temperature	Degrees
DSS__SRC	Output shaft speed (OSS) - raw signal	RPM
PID No.	PID Name	Units
TSS	Turbine shaft speed (TSS) - raw signal	RPM
TR	PRNDL position	-

TRANSMISSION DRIVE CYCLE TEST

Material

MATERIAL SPECIFICATION

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP	MERCON® SP

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 code to be set, and 5 times consecutively for continuous TCC code to set.

NOTE: When carrying out the Transmission Drive Cycle Test, refer to the Solenoid Application Chart for correct solenoid operation.

After carrying out the Quick Test, use the Transmission Drive Cycle Test for checking continuous codes.

1. Record and then erase Quick Test codes.
2. Warm engine to normal operating temperature.
3. Make sure transmission fluid level is correct.
4. With transmission in D6, 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 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. Carry out Quick Test and record continuous DTCs.
 - If the DTCs are still present, refer to the **DIAGNOSTIC TROUBLE CODE CHART**. Repair all non-transmission DTCs first as they can directly affect the operation of the transmission. Repeat the Quick Test and the Road Test to verify the correction. Erase the DTCs, carry out the Drive Cycle Test and repeat the Quick Test after completing the repair on the DTC.
 - If the continuous test passes and a concern is still present, refer to **DIAGNOSIS BY**

SYMPTOM, OASIS messages and TSBs for concerns.

After On-Board Diagnostic

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

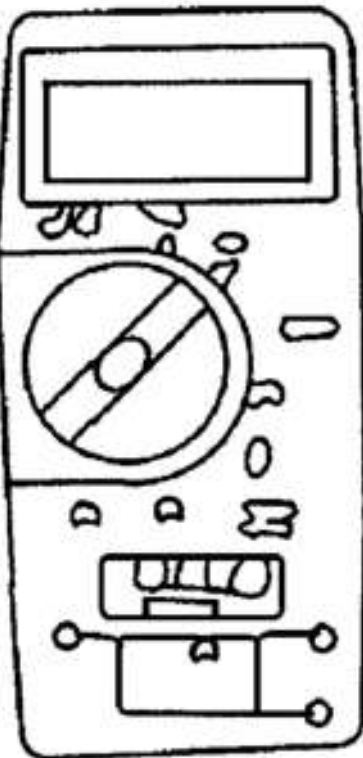
After the on-board diagnostic procedures are completed, repair all DTCs.

Begin with non-transmission related DTCs, then repair any transmission related DTCs. Use the diagnostic trouble code 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. See INTRODUCTION - GASOLINE article will aid in diagnosing non-transmission electronic components.

DIAGNOSTIC TROUBLE CODE (DTC) CHARTS

Special Tool(s)

SPECIAL TOOL



ST1137-A

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

Diagnostic Trouble Code Chart

DIAGNOSTIC TROUBLE CODE CHART

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0218	TFT	Transmission fluid over temperature condition	TCM has detected a TFT that has exceeded a set temperature	Aggressive lock-up schedule	Carry out normal diagnostic for an overheating condition. refer to <u>DIAGNOSIS BY SYMPTOM</u> .
P0562	Battery	System voltage low	TCM has detected a voltage level below minimum voltage to operate solenoids. Maintains current solenoid state	<ul style="list-style-type: none"> • No engagements • No adaptive strategy • No self learning strategy • May turn on MIL • Mechanical limp home mode • Battery voltage below 9 volts 	Monitor the appropriate Parameter Identification (PID) to validate that an error is present. Refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . See <u>INTRODUCTION - GASOLINE</u> article .
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 • May turn on MIL • Mechanical limp home mode • Battery voltage above 16 volts 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> in this section and the See <u>INTRODUCTION - GASOLINE</u> article .
P0603	TCM	Powertrain control module EEPROM error	TCM has detected an internal software concern with KAM	-	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the

					system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0605	TCM	The PCM ROM has been corrupted	PCM has detected an internal software concern with ROM	<ul style="list-style-type: none"> • May turn on MIL • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0613	TCM	TCM Processor	TCM has detected an internal software issue	May turn on MIL Mechanical limp home mode	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0634	TCM	TCM module temperature	Internal temperature within TCM to high	May turn on MIL Mechanical limp home mode Default to 3rd or 5th gear	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS</u>

					<p><u>IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
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"> • May turn on MIL • Mechanical limp home mode 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0657	TCM	Actuator supply voltage A circuit open	Power supply actuators open circuit	<ul style="list-style-type: none"> • May turn on MIL • Mechanical limp home mode 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0658	TCM	Actuator supply voltage A circuit low	Power supply actuators short circuit to	<ul style="list-style-type: none"> • May turn on MIL • Mechanical 	<p>Monitor the appropriate PID to validate that an error</p>

			ground	limp home mode	is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level 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"> • May turn on MIL • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0667	TCM-TFT	PCM, ECM, TCM internal temperature sensor range operation	Substrate temperature sensor	Transmission will shut down or will not shift due to a transmission fluid over temperature condition	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.

P0701	Transmission control system	Transmission control system. Range operation	TCM has detected a concern with the operational strategy	<ul style="list-style-type: none"> • Dual DTC code causing transmission default to a hydraulic limp-home mode. • May turn on MIL • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. Reflash the TCM first. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0705	TR sensor	TR sensor circuit error	TCM has detected a TR signal (P, R, N, D6, D4, 3, 2 or 1) is out of normal range	<ul style="list-style-type: none"> • May turn on MIL • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0711	TFT sensor	No change in TFT during operation	PCM has detected no TFT change during operation. TFT valve stuck at some normal reading.	<ul style="list-style-type: none"> • Firm shift • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the

					new mechatronic unit, it must be reflashed to the latest level calibration.
P0712	TFT sensor	TFT sensor circuit grounded	PCM has detected a voltage drop across TFT sensor exceeds scale set for temperature (grounded circuit)	<ul style="list-style-type: none"> • Firm shift • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0713	TFT sensor	TFT sensor circuit short to power	TCM has detected a voltage drop across TFT sensor; exceeds scale set for temperature	-	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0714	TFT sensor	TFT intermittent error	TCM has detected no TFT intermittent operation	-	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC

					returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0715	TSS sensor	TSS sensor circuit error	TSS has detected a short circuit to power	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • Mechanical limp home mode in 3rd gear • Max line pressure • No adaptive learning strategyW • Automatic mode only 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0716	TSS sensor	TSS range or operation insufficient input from TSS.	PCM has detected a loss or noisy TSS signal during operation.	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • Mechanical limp home mode in 3rd gear • Max line pressure • No adaptive learning strategy • Automatic mode only 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0717	TSS sensor	No TSS signal	PCM has not detected a TSS signal. No TSS signal when OSS signal is present	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • Mechanical limp home mode in 3rd 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear

				<ul style="list-style-type: none"> gear Max line pressure No adaptive learning strategy Automatic mode only 	all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0720	OSS sensor	No OSS signal	PCM has detected an OSS short circuit to power	<ul style="list-style-type: none"> No TCC engagements May turn on MIL Substitute wheel speed for OSS No adaptive learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0721	OSS sensor	OSS range or operation insufficient input from OSS	PCM has detected a loss or noisy OSS signal during operation	<ul style="list-style-type: none"> May turn on MIL Harsh shifts Substitute wheel speed for OSS No adaptive learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0722	OSS sensor	No OSS signal	PCM has not detected a OSS signal. No OSS signal when OSS signal is	<ul style="list-style-type: none"> May turn on MIL Harsh shifts Substitute 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC</u>

			present.	<ul style="list-style-type: none"> wheel speed for OSS No adaptive learning strategy 	<p><u>PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0723	OSS sensor	No OSS signal intermittent	PCM has detected an intermittent signal	<ul style="list-style-type: none"> Harsh shifts No TCC engagements Hold in gear currently selected Max line pressure No adaptive learning strategy 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0729	Transmission	Sixth gear ratio error	No 6th gear ratio detected by the TCM	<ul style="list-style-type: none"> No 6th gear No TCC engagements May turn on MIL No adaptive learning strategy No self learning strategy Mechanical limp home mode in 5th gear 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0731	Transmission	First gear ratio	No 1st gear	<ul style="list-style-type: none"> No 1st gear 	<p>Follow preliminary</p>

		error	ratio detected by the TCM	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • No adaptive learning strategy • No self learning strategy • Mechanical limp home mode in 3rd gear • Max line pressure 	<p>diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0781	Transmission	1-2 shift error	Incorrect ratio calculated during shift 1-2	<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) • No TCC engagements • No adaptive learning strategy • Hold in 3rd, 2nd or 1st gear 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0782	Transmission	2-3 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. 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>

				<p>Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material)</p> <ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Hold in 4th, 3rd or 2nd gear • May turn on MIL 	<p><u>IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0783	Transmission	3-4 shift error	Incorrect ratio calculated during shift 3-4	<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) • No TCC engagements • No adaptive learning strategy • Hold in 4th or 3rd gear • May turn on MIL 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0784	Transmission	4-5 shift error	Incorrect ratio calculated during shift 4-5	<ul style="list-style-type: none"> • Incorrect gear selection depending on 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to</p>

				<p>failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material)</p> <ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Hold in 5th or 4th gear • May turn on MIL 	<p>validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0732	Transmission	Second gear ratio error	No 2nd gear ratio detected by the TCM	<ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Max line pressure • May turn on MIL • Mechanical limp home mode in 3rd gear 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0733	Transmission	Third gear ratio error	No 3rd gear ratio detected by the TCM	<ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Max line pressure 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>.</p>

				<ul style="list-style-type: none"> • May turn on MIL • Hold in 5th gear 	<p><u>(PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0734	Transmission	Fourth gear ratio error	No 4th gear ratio detected by the TCM	<ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Max line pressure • May turn on MIL • Hold in 5th gear 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0735	Transmission	Fifth gear ratio error	No 5th gear ratio detected by the TCM	<ul style="list-style-type: none"> • No TCC engagements • No adaptive learning strategy • Max line pressure • May turn on MIL • Hold in 5th gear 	<p>Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.</p>
P0736	Transmission	Reverse gear ratio error	No reverse gear ratio detected	<ul style="list-style-type: none"> • No TCC engagements 	<p>Follow preliminary diagnostics. Monitor</p>

			by theTCM	<ul style="list-style-type: none"> • No adaptive learning strategy • Max line pressure • May turn on MIL • Hold in 4th gear 	the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.
P0829	Transmission	5-6 shift error	Incorrect ratio calculated during shift 5-6	<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). • No TCC engagements • Mechanical limp home in 3rd gear • Mechanical limp home in 2nd gear • May turn on MIL 	Follow preliminary diagnostics. Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new transmission. After installing the new transmission, the TCM module must be reflashed to the latest level calibration.
P0960	PC A	PC A circuit or solenoid failure or open circuit	PC A circuit or solenoid (EDS5) failed during operation	<ul style="list-style-type: none"> • No adaptive strategy • No self learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS</u>

				<ul style="list-style-type: none"> • Max line pressure 	<u>IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0962	PC A	PC A solenoid signal or ground circuits either short or open solenoid circuit failure	Voltage through PC A solenoid (EDS5) is checked. An error will be noted if tolerance is exceeded.	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0963	PC A	PC A solenoid short to power circuit failure	Voltage through PC A solenoid (EDS5) is checked. An error will be noted if tolerance is exceeded	<ul style="list-style-type: none"> • Max line pressure • Deactivate clutch adaptations 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART.</u> Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0972	SS A	SS A circuit or solenoid failure	SS A (EDS1) circuit or solenoid failure	<ul style="list-style-type: none"> • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error

				<ul style="list-style-type: none"> • May turn on MIL 	<p>is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0973	SS A	SS A solenoid or circuit shorted to ground or open	Voltage through SS A solenoid (EDS1) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0974	SS A	SS A solenoid or circuit shorted to power or open	Voltage through SS A solenoid (EDS1) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>

P0975	SS B	SS B circuit shorted to ground or open	SS B (EDS2) circuit or solenoid failure	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0976	SS B	SS B solenoid or circuit shorted to ground or open	Voltage through SS B solenoid (EDS2) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.</p>
P0977	SS B	SS B solenoid or circuit shorted to power or open	Voltage through SS B solenoid (EDS2) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	<p>Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u>. Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit,</p>

					it must be reflashed to the latest level calibration.
P0978	SS C	SS C circuit shorted to ground or open	SS C (EDS3) circuit or solenoid failure	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0979	ss c	SS C solenoid or circuit shorted to ground or open	Voltage through SS C solenoid (EDS3) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0980	SS C	SS C solenoid or circuit shorted to power or open	Voltage through SS C solenoid (EDS3) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new

					mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0981	SS D	SS D circuit shorted to ground or open	SS D (EDS4) circuit or solenoid failure	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0982	SS D	SS D solenoid or circuit shorted to ground or open	Voltage through SS D solenoid (EDS 4) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0983	SS D	SS D solenoid or circuit shorted to power or open	Voltage through SS D solenoid (EDS 4) is checked. An error will be noted if tolerance is exceeded. Short to ground	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the

			failure detected		system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0770	SS E	SS E circuit or solenoid failure	SS E (MV1) circuit or solenoid failure	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0985	SS E	SS E solenoid signal circuit shorted to ground or open	Voltage through SS E solenoid (MV1) is checked. An error will be noted if tolerance is exceeded. Short to ground failure detected	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P0986	SS E	SS E solenoid or circuit shorted to power or open	Voltage through SS E solenoid (MV1) is checked. An error will be noted if	<ul style="list-style-type: none"> • Mechanical limp home mode • May turn on MIL 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS</u>

			tolerance is exceeded. Short to ground failure detected		<u>IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P1707	Transmission	Park/neutral switch circuit failure	Circuit or sensor failure	Engine will not crank in PARK or NEUTRAL or engine will crank in all gears	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P1910	Reverse lamp circuit	Reverse solenoid circuit failure	Reverse solenoid (MV3) circuit failed open	<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 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all the DTCs. Test system for normal operation. If DTC returns, See <u>INTRODUCTION - GASOLINE</u> article .
P1911	Reverse lamps	Reverse solenoid signal circuit shorted to ground. Circuit low	Reverse solenoid (MV3) circuit fails to provide voltage drop across solenoid	-	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION</u>

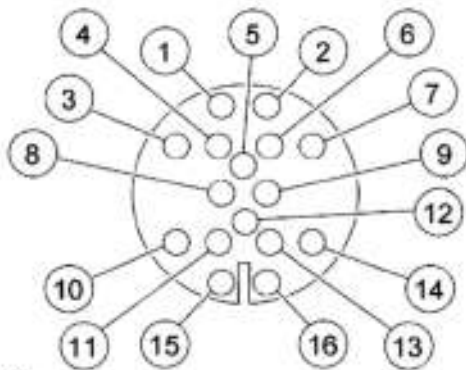
					<u>(PID) CHART</u> . Clear all the DTCs. Test system for normal operation. If DTC returns, See <u>INTRODUCTION - GASOLINE</u> article .
P1912	Reverse lamps	Reverse solenoid circuit shorted to power. Circuit high	Reverse solenoid (MV3) circuit fails to provide voltage drop across solenoid. Circuit shorted to power	Park lock or interlock switched OFF	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all the DTCs. Test system for normal operation. If DTC returns, See <u>INTRODUCTION - GASOLINE</u> article .
P0740	TCC solenoid	TCC solenoid circuit failure	TCC solenoid (EDS6) circuit fails. Circuit open	<ul style="list-style-type: none"> • May turn on MIL • No adaptive learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P2763	TCC	TCC solenoid signal circuit shorted to ground. Circuit high	TCC solenoid (EDS6) circuit fails to provide voltage drop across solenoid. Circuit shorted to power	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • No adaptive learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new

					mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
P2764	TCC	TCC solenoid circuit shorted to power. Circuit low	TCC solenoid (EDS6) circuit fails to provide voltage drop across solenoid	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • No adaptive learning strategy 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all DTCs. Test the system for normal operation. If the DTC returns, install a new mechatronics unit. After installing the new mechatronic unit, it must be reflashed to the latest level calibration.
U0073	CAN	CAN communication link error	CAN communication bus OFF, short circuit CAN high to CAN low	-	See <u>INTRODUCTION - GASOLINE</u> article .
U0155	CAN	TCM communication link error	CAN link error detected by TCM and IP	No communication with instrument panel cluster (IPC)	See <u>INTRODUCTION - GASOLINE</u> article
U0100	CAN	TCM communication link error	CAN link error detected by PCM, between TCM and ECM	<ul style="list-style-type: none"> • Mechanical limp home mode in 3rd gear • Max line pressure • No adaptive learning strategy 	See <u>INTRODUCTION - GASOLINE</u> article
U0121	CAN	TCM communication link error	PCM/TCM have detected an error in the CAN wheel RPM information from the ABS system.	-	See <u>INTRODUCTION - GASOLINE</u> article

P0219	RPM	Engine RPM for CAN	Engine RPM signal from CAN to high	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL • Hold in 5 th gear 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . See <u>INTRODUCTION - GASOLINE</u> article .
P062F	TCM	TCM EEPROM error	Internal PCM error with EEPROM	<ul style="list-style-type: none"> • May turn on MIL • Mechanical limp home mode 	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . See <u>INTRODUCTION - GASOLINE</u> article .
P0741	TCC	TCC solenoid circuit stuck open	TCC solenoid (EDS6), clutch or circuit open	<ul style="list-style-type: none"> • No TCC engagements • May turn on MIL 	Carry out normal diagnostics for TCC.
P1934	vss	VSS input signal error	VSS input does not match OSS signal	Possible installation of wrong tire or axle. Wrong ratio	Monitor the appropriate PID to validate that an error is present. refer to <u>DIAGNOSTIC PARAMETERS IDENTIFICATION (PID) CHART</u> . Clear all the DTCs. See <u>INTRODUCTION - GASOLINE</u> article .
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, ETC sensor failure and MAF sensor failures may be present. MIL may illuminate	See <u>INTRODUCTION - GASOLINE</u> article .
U0401	PCM/TCM	Invalid data	Data received	Transmission may	See

		received from the PCM or engine components	from the PCM or engine components is not correct for the vehicle operating conditions	enable limp-home strategies or increase pressures. Engine components and PCM may or may not set additional DTCs. P2544, fuel monitor error, ETC sensor failure and MAF sensor failures may be present. MIL may illuminate	<u>INTRODUCTION - GASOLINE</u> article .
--	--	--	---	---	--

TRANSMISSION CONNECTOR LAYOUTS



N0033244

Pin Number	Circuit	Circuit Function
1	—	M (manual gear)
2	—	CAN low
3	—	Kline
4	—	Tip -
5	—	Tip +
6	—	CAN high
7	—	UDRV supply of reverse relay (backup relay high)
8	—	NOT USED
9	—	Term 15 (ignition)
10	—	Park/neutral signal (to PCM TRSW-PN T-18)
11	—	Ground
12	—	NOT USED
13	—	Term 31 (ground)
14	—	Term 30 (battery voltage)
15	—	Low side of reverse light relay (keylock) (back-up relay low)
16	—	Terminal 31 (ground)

Fig. 4: Identifying Transmission Vehicle Harness Connector
 Courtesy of FORD MOTOR CO.

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

See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the engine idle speed.

Stall Speed Test

WARNING: Apply the service and parking brakes firmly while carrying out each stall test.

CAUTION: Carry out the Line Pressure Test prior to carrying out the Stall Speed Test. If line pressure is low at stall, do not carry out the Stall Speed Test or further transmission damage will occur.

NOTE: The stall test should only be carried out with the engine and transmission at normal operating temperatures.

The stall test checks the operation of the following items:

- Torque converter one-way clutch
 - Forward clutch
 - Low one-way clutch
 - Reverse clutch
 - Overdrive one-way clutch
 - Direct clutch
 - Engine driveability concerns
1. Connect a tachometer to the engine.
 2. After testing each of the following ranges, D6/D4, 2, 1 and R, move the transmission range selector lever to N (NEUTRAL) and run the engine for about 15 seconds to allow the torque converter to cool before testing the next range.

CAUTION: If the engine rpm recorded by the tachometer exceeds the maximum specified rpm, release the accelerator pedal immediately. Clutch slippage is indicated.

CAUTION: Do not maintain wide-open throttle (WOT) in any gear range for more than 5 seconds or damage to the transmission may occur.

3. Press the accelerator pedal to the floor (WOT) in each range. Record the rpm reached in each range. Stall speeds should be in the appropriate range.

Stall Speed Chart

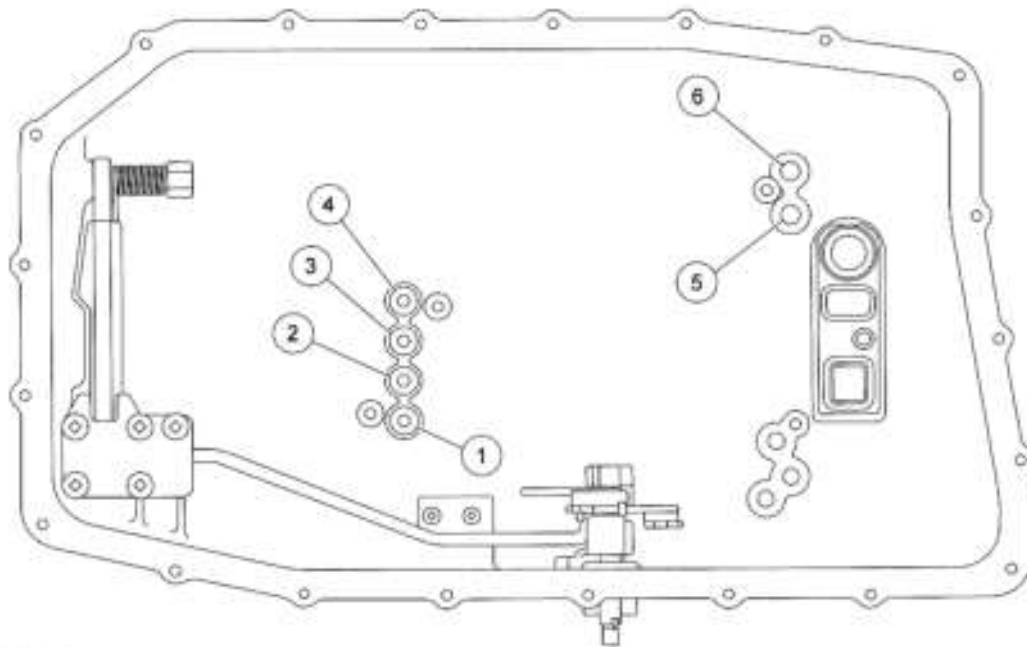
STALL SPEED CHART

Series	Engine	Min.	Max.
Navigator	5.4L 3V	1,650	2,150

If the stall speeds were too high, refer to the following **STALL SPEED** Diagnosis Chart. If the stall speeds were too low, check engine tune-up. If the engine is OK, remove the torque converter and check the torque

converter reactor one-way clutch for slippage.

Air Pressure Test



N0033245

Item	Part Number	Description
1	—	Clutch C port
2	—	Clutch D1 port
3	—	Clutch D2 port
4	—	Direct clutch (B) port
5	—	Overdrive clutch (E) port
6	—	Forward clutch (A) port

Fig. 5: Identifying Air Pressure Test
Courtesy of FORD MOTOR CO.

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 transmission range selector lever is in a forward gear range (D6/D4, 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 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:

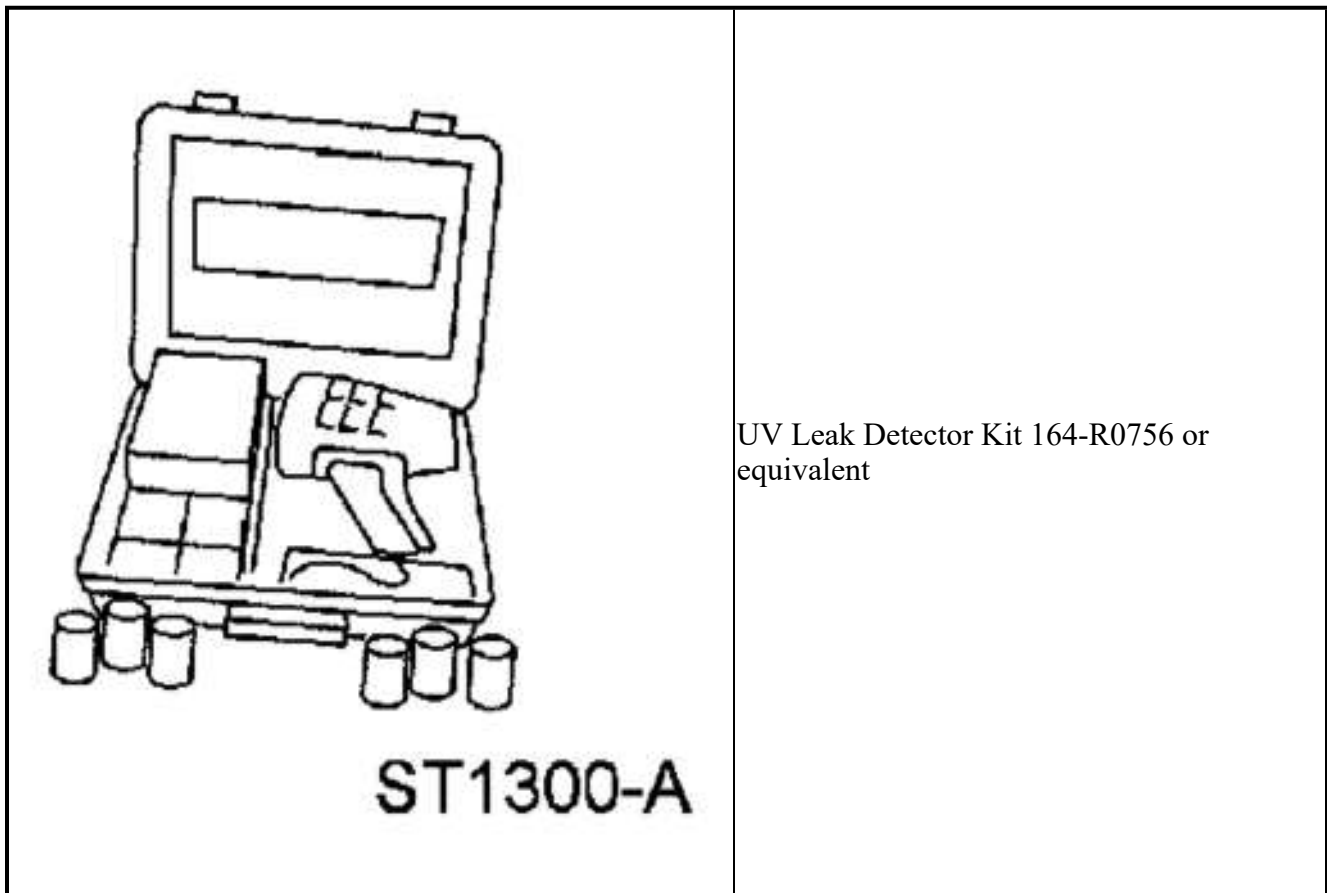
- the piston seals are not seated, damaged or not installed correctly.
- plugged feed holes for clutch apply in the case and/or clutch cylinder.
- damaged piston and/or clutch cylinder.

6. Service as required and recheck.

LEAKAGE INSPECTION

Special Tool(s)

LEAKAGE INSPECTION - SPECIAL TOOL



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 retaining bolts to specification. Refer to **TORQUE SPECIFICATIONS**.

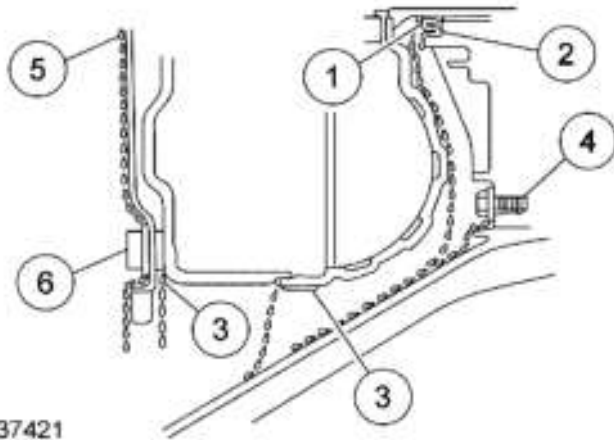
When fluid is found to be leaking between the case and the cooler tube fitting, tighten the fitting to maximum specification.

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

Check for 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

Leakage at the front of the transmission, as evidenced by 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 leak before removing the transmission from the vehicle. The paths which the fluid takes to reach the bottom of the torque converter housing are shown in the illustration. The 5 numbers in the illustration correspond with the 5 flow path steps.



N0037421

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 screws
1, 2 and 4	Leak at front of transmission	Pump gasket
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

Fig. 6: Identifying Fluid Flow Paths
 Courtesy of FORD MOTOR CO.

Transmission Leak Check Test Procedure

Add oil-soluble aniline or fluorescent dye to the transmission fluid. Use one ounce of dye for every 3.8 liters (4 quarts) of transmission fluid. Add any additional transmission fluid to bring it to 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 hose leaks into the engine coolant system. An ultraviolet light must be used to

detect the fluorescent dye solution.

1. Remove the fluid level fill plug and note the color of the fluid that drips out. Original factory fill fluid is clear and red if the fluid has been exchanged.
2. Clean off any 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. 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. Observe the back of the cylinder block and top of the torque converter housing for evidence of 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 fluid leakage is evident and the probable source of leakage can be determined. Repair as required.

EXTERNAL FLUID LEAKS

Leak Path	Possible Source
Leaks at the fluid pan to case	<ul style="list-style-type: none">• Pan bolts not tightened to specification.• Pan gasket damaged.• Case pan rail damaged.
Fluid cooler tubes or O-rings leaking	<ul style="list-style-type: none">• Cooler tube(s), cooler tube O-rings damaged.• Cooler tube hold-down plate damaged.
Leaks at the fluid cooler	<ul style="list-style-type: none">• Fluid cooler damaged.• 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 installation of new transmission fluid cooler tube, refer to TRANSAXLE/TRANSMISSION COOLING.

TRANSMISSION FLUID COOLER

CAUTION: Whenever a transmission has been disassembled to install new parts, the transmission fluid cooler and transmission fluid cooler tubes must be cleaned and backflushed. Use a torque converter/oil cooler cleaner.

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.

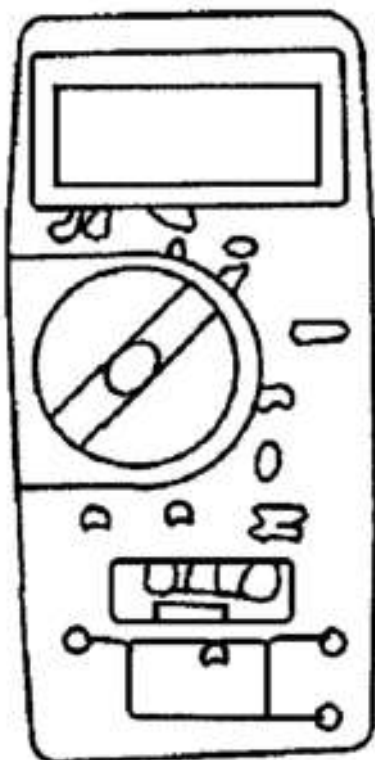
When internal wear or damage has occurred in the transmission, metal particles, clutch plate material or

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.

DIAGNOSIS BY SYMPTOM

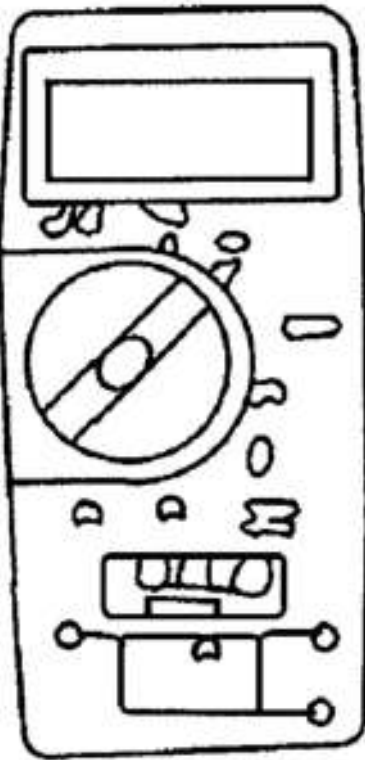
Special Tool(s)

SPECIAL TOOL



ST1137-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

The Diagnosis By Symptom gives the technician diagnostic information and direction. It 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:
 - a. preliminary inspections.
 - b. verifications of condition.
 - c. checking the fluid levels.
 - d. carrying out other test procedures as directed.

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 Hydraulic/Mechanical Routine listed.

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, you may experience slightly firm shifts, delayed or early shifts. 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.

4. Follow the reference or action required statements. Always carry out the on-board diagnostic 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 repair is correct.

Diagnosis by Symptom Index

DIAGNOSIS BY SYMPTOM INDEX

Title	Routines
Engagement Concerns	
No Forward	<u>201</u>
No Reverse	<u>202</u>
Harsh Reverse	<u>203</u>
Harsh Forward	<u>204</u>
Delayed/Soft Reverse	<u>205</u>
Delayed/Soft Forward	<u>206</u>
No forward and no reverse	<u>207</u>
Harsh forward and harsh reverse	<u>208</u>
Shift Concerns	
Some/All Shifts Missing	<u>210</u>
Timing - Early/Late	<u>211</u>
Timing - Erratic/Hunting	<u>212</u>
Feel Concerns	
Soft/Slipping (some or all)	<u>213</u>
Harsh (some or all)	<u>214</u>
No 1st Gear, Engages in Higher Gear	<u>215</u>
No Manual 1st Gear	<u>216</u>
No Manual 2nd Gear	<u>217</u>
No Manual 3rd Gear	<u>218</u>
No 1-2 shift (automatic)	<u>220</u>
No 2-3 shift (automatic)	<u>221</u>
No 3-4 shift (automatic)	<u>222</u>
No 4-5 shift (automatic)	270
No 5-6 shift (automatic)	<u>272</u>
No 6-5 shift (automatic)	<u>273</u>
No 5-4 shift (automatic)	<u>271</u>
No 4-3 shift (automatic)	<u>223</u>
No 3-2 shift (automatic)	<u>224</u>

No 2-1 shift (automatic)	<u>225</u>
Torque Converter Operation Concerns	
No Apply	<u>240</u>
Cycling/Chatter	<u>241</u>
Always applied/stalls vehicle	<u>242</u>
Other Concerns	
External Leaks	<u>252</u>
Noise/Vibration in Forward or Reverse	<u>254</u>
Noise/Vibration that change with vehicle speed	<u>255</u>
Noise/Vibration that change with engine speed	256
Engine Will Not Crank	<u>257</u>
No Park (P) Range	<u>258</u>
Transmission Overheating	<u>259</u>
Fluid venting/foaming	<u>260</u>

Diagnostic Routines

Engagement Concerns: No Forward in D6 or D4 Only

DIAGNOSTIC ROUTINES

Possible Component	Reference/Action
201 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Dective SSA (EDS1) shift solenoid • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</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>
Clutch Plates <ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure • Direct clutch (B) friction and steel plate - failure • Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new forward clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY.</u> • Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u> • Install a new low/reverse clutch assembly. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY.</u>
Fluid <ul style="list-style-type: none"> • Incorrect fluid level 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION.</u>
Shift Linkage <ul style="list-style-type: none"> • Shift linkage - 	<ul style="list-style-type: none"> • Inspect and repair as required. Verify transmission shift cable adjustment. Refer to <u>AUTOMATIC</u>

damage or
incorrectly adjusted

TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS .
Adjust transmission shift cable as necessary.

Engagement Concerns: No Reverse Only

ENGAGEMENT CONCERNS

Possible Component	Reference/Action
202 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> Defective SSB (EDS2) shift solenoid Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</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>.
Clutch Plates <ul style="list-style-type: none"> Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> Install a new low/reverse clutch assembly. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.
Shift Linkage <ul style="list-style-type: none"> Shift linkage - damage or incorrectly adjusted 	<ul style="list-style-type: none"> Inspect and repair as required. Verify transmission shift cable adjustment. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . Adjust transmission shift cable as necessary.
Fluid level <ul style="list-style-type: none"> Incorrect fluid level 	<ul style="list-style-type: none"> Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>.

Engagement Concerns: Harsh Reverse Only

ENGAGEMENT CONCERNS - HARSH REVERSE ONLY

Possible Component	Reference/Action
203 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> Defective SSB (EDS2) shift solenoid TCM mechatronic unit - failed Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
Fluid <ul style="list-style-type: none"> Incorrect fluid level 	<ul style="list-style-type: none"> Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</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

ENGAGEMENT CONCERNS - HARSH FORWARD ONLY

Possible Component	Reference/Action
204 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSA (EDS1) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
Fluid <ul style="list-style-type: none"> • Incorrect fluid level 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</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: Delayed/Soft Reverse Only

ENGAGEMENT CONCERNS: DELAYED/SOFT REVERSE ONLY

Possible Component	Reference/Action
205 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSB (EDS2) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
Fluid <ul style="list-style-type: none"> • Incorrect fluid level • Fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>. • Install a new fluid pan and filter assembly.

Engagement Concerns: Delayed/Soft Forward Only

ENGAGEMENT CONCERNS: DELAYED/SOFT FORWARD ONLY

--	--

Possible Component	Reference/Action
206 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> Defective SSA (EDS1) shift solenoid TCM mechatronic unit - failed Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
Fluid <ul style="list-style-type: none"> Incorrect fluid level Fluid filter and seal assembly - plugged, damaged 	<ul style="list-style-type: none"> Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>. Install a new fluid pan and filter assembly.

Engagement Concerns: No Forward and No Reverse

ENGAGEMENT CONCERNS: NO FORWARD AND NO REVERSE

Possible Component	Reference/Action
207 - ROUTINE	
Fluid <ul style="list-style-type: none"> Incorrect fluid level 	<ul style="list-style-type: none"> Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</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: Harsh Forward and Harsh Reverse

ENGAGEMENT CONCERNS: HARSH FORWARD AND HARSH REVERSE

Possible Component	Reference/Action
208 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> D6 default to 5th gear and D4 default to 3rd gear Electronic component - failure 	<ul style="list-style-type: none"> Retrieve DTC codes. Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.

Engagement Concerns: Delayed Forward and Delayed Reverse

ENGAGEMENT CONCERNS: DELAYED FORWARD AND DELAYED REVERSE

Possible Component	Reference/Action
209 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> TCM mechatronic unit - 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN</u>

failed

CONTROL VALVE BODY.

Shift Concerns: Some/All Shifts Missing

SHIFT CONCERNS: SOME/ALL SHIFTS MISSING

Possible Component	Reference/Action
210 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses, solenoids, transmission range (TR) sensor, SSA solenoid, PC A solenoid • Multiple shift missing (more than one gear) 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again. • 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.
Shift Linkage Damaged or Incorrectly Adjusted <ul style="list-style-type: none"> • External shift cable 	<ul style="list-style-type: none"> • Inspect and repair as required. Verify transmission shift cable adjustment. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . Adjust transmission shift cable as necessary.
Forward Clutch (A) Assembly (No Shifts) <ul style="list-style-type: none"> • Seals, piston - damaged • Friction elements - damaged or worn • Return springs - damaged 	<ul style="list-style-type: none"> • Inspect for damage. Install a new assembly. • Inspect for damage. Install a new assembly. • Inspect for damage. Install a new assembly.

Shift Concerns: Timing - Early/Late

SHIFT CONCERNS: TIMING - EARLY/LATE

Possible Component	Reference/Action
211 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
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 certification label. Changes in tire size and axle ratio will affect shift timing.
Powertrain Control System <ul style="list-style-type: none"> • Engine driveability concerns 	<ul style="list-style-type: none"> • Refer to <u>ENGINE SYSTEM-GENERAL</u>

	<u>INFORMATION .</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.
Mechatronics <ul style="list-style-type: none"> • Bolts not tightened to specification • Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> • Tighten to specification. • Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>

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

SHIFT CONCERNS: TIMING - ERRATIC/HUNTING (SOME/ALL)

Possible Component	Reference/Action
212 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Fluid <ul style="list-style-type: none"> • Incorrect level • Condition • Fluid over temperature condition 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION.</u> • Carry out the fluid level check in Preliminary Inspection. • Refer to <u>TRANSMISSION OVERHEATING.</u>
Torque Converter Concerns <ul style="list-style-type: none"> • Torque converter clutch 	<ul style="list-style-type: none"> • Refer to <u>TORQUE CONVERTER CLUTCH OPERATION CONCERN: CYCLING SHUTTER CHATTER.</u>

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

SHIFT CONCERNS: FEEL - SOFT OR SLIPPING (SOME OR ALL)

Possible Component	Reference/Action
213 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Transmission Fluid Temperature (TFT) Sensor Damaged	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer

<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, stick or bore damaged 	<p>to <u>MAIN CONTROL VALVE BODY.</u></p> <ul style="list-style-type: none"> • Tighten to specification. • Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
--	---

Shift Concerns: Feel - Harsh (Some/All)

SHIFT CONCERNS: FEEL - HARSH (SOME/ALL)

Possible Component	Reference/Action
214 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.

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

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, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Incorrect Gear <ul style="list-style-type: none"> • Mechatronic failure 	<ul style="list-style-type: none"> • Determine which gear the transmission is in. Refer to the Clutch and Solenoid Application Charts.

Shift Concerns: No 1st Gear Manual

SHIFT CONCERNS: NO 1ST GEAR MANUAL

Possible Component	Reference/Action
216 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Shift Linkage <ul style="list-style-type: none"> • External shift cable system - damaged, misaligned 	<ul style="list-style-type: none"> • Inspect and repair as necessary.
Mechatronics <ul style="list-style-type: none"> • Defective SSA (EDS1) shift solenoid • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</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>.
Clutch Plates	<ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure • Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new forward clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>. • Install a new low/reverse clutch assembly, Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 2nd Gear Manual

SHIFT CONCERNS: NO 2ND GEAR MANUAL

Possible Component	Reference/Action
217 - ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Shift Linkage	
<ul style="list-style-type: none"> • External shift cable system - damaged, misaligned 	<ul style="list-style-type: none"> • Inspect and repair as necessary.
Mechatronics	
<ul style="list-style-type: none"> • Defective SSA (EDS1) shift solenoid • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</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>.
Clutch Plates	
<ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure • Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new forward clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY</u>. • Install a new low/reverse clutch assembly, Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY</u>.

Shift Concerns: No 3rd Gear Manual

SHIFT CONCERNS: NO 3RD GEAR MANUAL

Possible Component	Reference/Action
218 - ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • PCM electrical inputs/outputs, TCM, external vehicle wiring harnesses 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs. Road test and carry out on-board diagnostic test again.
Shift Linkage	

<ul style="list-style-type: none"> External shift cable system - damaged, misaligned 	<ul style="list-style-type: none"> Inspect and repair as necessary.
Mechatronics <ul style="list-style-type: none"> Defective SSB (EDS2) shift solenoid Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</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>
Clutch Plates <ul style="list-style-type: none"> Forward clutch (A) friction and steel plate - failure Direct clutch (B) friction and steel plate - failure Low/reverse clutch (D) friction and steel plate - failure. 	<ul style="list-style-type: none"> Install a new forward clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY.</u> Install a new intermediate clutch assembly. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY.</u> Install a new low/reverse clutch assembly. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 1-2 Shift

SHIFT CONCERNS: NO 1-2 SHIFT

Possible Component	Reference/Action
220 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> Defective SSC (EDS 3) shift solenoid Defective SSD (EDS4) shift solenoid TCM mechatronic unit - failed Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> Intermediate clutch (C) friction and steel plate - failure Low/reverse clutch (D) friction and steel plate - failure 	<ul style="list-style-type: none"> Install a new intermediate clutch assembly. Install a new low/reverse clutch assembly. Refer to <u>LOW/REVERSE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 2-3 Shift

SHIFT CONCERNS: NO 2-3 SHIFT

Possible Component	Reference/Action
221 - ROUTINE	
Mechatronics	

<ul style="list-style-type: none"> • Defective SSB (EDS2) shift solenoid • Defective SSC (EDS3) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> • Direct clutch (B) friction and steel plate - failure • Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u> • Install a new intermediate clutch assembly. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 3-4 Shift

SHIFT CONCERNS: NO 3-4 SHIFT

Possible Component	Reference/Action
222 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSB (EDS2) shift solenoid • Defective SSD (EDS4) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> • Direct clutch (B) friction and steel plate - failure • Overdrive clutch (E) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u> • Install a new overdrive clutch assembly. Refer to <u>OVERDRIVE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 4-5 Shift

SHIFT CONCERNS: NO 4-5 SHIFT

Possible Component	Reference/Action
227 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSA (EDS1) shift solenoid • Defective SSB (EDS2) shift solenoid 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>

<ul style="list-style-type: none"> • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure • Direct clutch (B) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new direct clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY.</u> • Install a new overdrive clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u>

Shift Concerns: No 5-6 Shift

SHIFT CONCERNS: NO 5-6 SHIFT

Possible Component	Reference/Action
272 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSB (EDS2) shift solenoid • Defective SSC (EDS 3) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> • Forward clutch (A) friction and steel plate - failure • Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new direct clutch assembly. Refer to <u>FORWARD CLUTCH ASSEMBLY.</u> • Install a new overdrive clutch assembly. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 6-5 Shift

SHIFT CONCERNS: NO 6-5 SHIFT

Possible Component	Reference/Action
273 - ROUTINE	
Mechatronics <ul style="list-style-type: none"> • Defective SSC (EDS 3) shift solenoid • TCM mechatronic unit - failed • Electronic component - failure 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none"> • Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> • Install a new overdrive clutch assembly. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 5-4 Shift

SHIFT CONCERNS: NO 5-4 SHIFT

Possible Component	Reference/Action
271 - ROUTINE	
Mechatronics <ul style="list-style-type: none">• Defective SSB (EDS2) shift solenoid• TCM mechatronic unit - failed• Electronic component - failure	<ul style="list-style-type: none">• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none">• Direct clutch (B) friction and steel plate - failure	<ul style="list-style-type: none">• Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u>

Shift Concerns: No 4-3 Shift

SHIFT CONCERNS: NO 4-3 SHIFT

Possible Component	Reference/Action
223 - ROUTINE	
Mechatronics <ul style="list-style-type: none">• Defective SSB (EDS2) shift solenoid• Defective SSD (EDS4) shift solenoid• TCM mechatronic unit - failed• Electronic component - failure	<ul style="list-style-type: none">• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
Clutch Plates <ul style="list-style-type: none">• Direct clutch (B) friction and steel plate - failure• Overdrive clutch (E) friction and steel plate - failure	<ul style="list-style-type: none">• Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u>• Install a new overdrive clutch assembly. Refer to <u>OVERDRIVE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 3-2 Shift

SHIFT CONCERNS: NO 3-2 SHIFT

Possible Component	Reference/Action
224 - ROUTINE	
Mechatronics <ul style="list-style-type: none">• Defective SSB (EDS2) shift solenoid• Defective SSC (EDS 3) shift	<ul style="list-style-type: none">• Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>• Install a new mechatronic assembly. Refer to <u>MAIN</u>

<ul style="list-style-type: none"> solenoid TCM mechatronic unit - failed Electronic component - failure 	<p><u>CONTROL VALVE BODY.</u></p> <ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
<p>Clutch Plates</p> <ul style="list-style-type: none"> Direct clutch (B) friction and steel plate - failure Intermediate clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u> Install a new overdrive clutch assembly. Refer to <u>INTERMEDIATE CLUTCH ASSEMBLY.</u>

Shift Concerns: No 2-1 Shift

SHIFT CONCERNS: NO 2-1 SHIFT

Possible Component	Reference/Action
225 - ROUTINE	
<p>Mechatronics</p> <ul style="list-style-type: none"> Defective SSC (EDS3) shift solenoid TCM mechatronic unit - failed Electronic component - failure 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
<p>Clutch Plates</p> <ul style="list-style-type: none"> Direct clutch (C) friction and steel plate - failure 	<ul style="list-style-type: none"> Install a new direct clutch assembly. Refer to <u>DIRECT CLUTCH ASSEMBLY.</u>

Torque Converter Clutch Operation Concerns : Does Not Apply

TORQUE CONVERTER CLUTCH OPERATION CONCERNS : DOES NOT APPLY

Possible Component	Reference/Action
240 - ROUTINE	
<p>Mechatronics</p> <ul style="list-style-type: none"> Defective TCC (EDS 6) shift solenoid Mechatronic assembly bolts - not tightened to specification Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u> Tighten to specification. Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY.</u>
<p>Fluid</p> <ul style="list-style-type: none"> Fluid condition 	<ul style="list-style-type: none"> Carry out the fluid level check in Preliminary Inspection.
<p>Torque Converter</p>	<ul style="list-style-type: none"> Remove the transmission. Inspect for

<ul style="list-style-type: none"> • Torque converter components 	<p>damage, install a new or remanufactured torque converter. Refer to <u>TRANSMISSION - 4X4</u> or <u>TRANSMISSION - 4X2</u>.</p>
<p>Powertrain Control Module</p> <ul style="list-style-type: none"> • Powertrain control system electrical inputs/outputs, TCM, vehicle wiring harnesses, torque converter clutch (TCC) solenoid, transmission fluid temperature (TFT) sensor 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.

Torque Converter Clutch Operation Concerns : Cycling/Chatter

TORQUE CONVERTER CLUTCH OPERATION CONCERNS : CYCLING/CHATTER

Possible Component	Reference/Action
241 - ROUTINE	
<p>Mechatronics</p> <ul style="list-style-type: none"> • Defective TCC (EDS 6) shift solenoid • Mechatronic assembly bolts - not tightened to specification • Mechatronic unit contaminated, solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>. • Tighten to specification. • Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
<p>Fluid</p> <ul style="list-style-type: none"> • Fluid condition 	<ul style="list-style-type: none"> • Carry out the fluid level check in Preliminary Inspection.
<p>Torque Converter</p> <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 - 4X4</u> or <u>TRANSMISSION - 4X2</u>.
<p>Powertrain Control Module</p> <ul style="list-style-type: none"> • Powertrain control system electrical inputs/outputs, TCM, vehicle wiring harnesses, torque converter clutch (TCC) solenoid, transmission fluid temperature (TFT) sensor 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.

Torque Converter Clutch Operation Concerns : Always Applied/Stalls Vehicle

TORQUE CONVERTER CLUTCH OPERATION CONCERNS : ALWAYS APPLIED/STALLS VEHICLE

Possible Component	Reference/Action
242 - ROUTINE	
<p>Mechatronics</p> <ul style="list-style-type: none"> • Defective TCC (EDS 6) shift solenoid 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.

<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 	<ul style="list-style-type: none"> • Tighten to specification. • Inspect for damage. If damaged, install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.
Fluid <ul style="list-style-type: none"> • Fluid condition 	<ul style="list-style-type: none"> • Carry out the fluid level check in Preliminary Inspection.
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 - 4X4</u> or <u>TRANSMISSION - 4X2</u>.
Power train Control Module <ul style="list-style-type: none"> • Powertrain control system electrical inputs/outputs, TCM, vehicle wiring harnesses, torque converter clutch (TCC) solenoid, transmission fluid temperature (TFT) sensor 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.

Other Concerns: External Leaks

OTHER CONCERNS: EXTERNAL LEAKS

Possible Component	Reference/Action
252 - ROUTINE	
Fluid <ul style="list-style-type: none"> • Incorrect level • Transmission case vent - damaged, case porosity • Leakage at gaskets, seals, bulkhead connector 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>. • Inspect for damage. If damaged, repair as necessary. • Refer to <u>LEAKAGE INSPECTION, FLUID LEAKAGE IN THE TORQUE CONVERTER AREA</u> and <u>TRANSMISSION LEAK CHECK TEST PROCEDURES</u> in this section for potential leak locations. Remove all traces of lubricant on exposed surface of the transmission. Repair as necessary.
Fluid Cooler Tubes <ul style="list-style-type: none"> • Cooler tube fittings • Cooler tube O-rings, cooler tubes 	<ul style="list-style-type: none"> • Locate leak source. Repair as required. Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u>. • Locate leak source. Repair as required. Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u>.
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>.
Transmission <ul style="list-style-type: none"> • Case Case - leaking • Transmission electrical bulkhead connector • Fluid fill plug • Output shaft seal • Manual control lever seal • Transmission fluid pan seal (gasket) • Fluid drain plug 	<ul style="list-style-type: none"> • Install a new transmission case. Refer to <u>TRANSMISSION</u>. • Install a new transmission electrical bulkhead connector O-ring. • Install a new fill plug. • Install a new seal. Refer to <u>OUTPUT SHAFT SEAL</u>. • Install a new seal. • Install a new seal. • Install a new drain plug.
Torque Converter <ul style="list-style-type: none"> • Torque converter studs • Torque converter hub seal • Torque converter weld 	<ul style="list-style-type: none"> • Install a new torque converter. • Install a new torque converter hub seal. • Install a new torque converter.

Noise/Vibration - Forward or Reverse: For Noises/Vibrations That Change With Engine Speed

NOISE/VIBRATION - FORWARD OR REVERSE

Possible Component	Reference/Action
254 - ROUTINE	
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.
Fluid <ul style="list-style-type: none"> • Fluid level (low) pump cavitation 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>.
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> .
Fluid Cooler Tubes <ul style="list-style-type: none"> • Cooler line grounding out 	<ul style="list-style-type: none"> • Adjust or reposition cooler tubes.

Noise/Vibration - Forward or Reverse: For Noises/Vibrations That Change With Vehicle Speed

NOISE/VIBRATION - FORWARD OR REVERSE

Possible Component	Reference/Action
255 - ROUTINE	
<p>Engine Driveline</p> <ul style="list-style-type: none"> • Engine mounts - loose or damaged • Driveline concerns: <ul style="list-style-type: none"> ○ U-joints ○ Rear axle ○ Suspension ○ Modifications • First gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Second gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Third gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Fourth gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Fifth gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Sixth gear: <ul style="list-style-type: none"> ○ Torque converter ○ Gearset ○ Friction elements • Reverse gear: <ul style="list-style-type: none"> ○ Gearset ○ Friction elements 	<ul style="list-style-type: none"> • Locate source of disturbance and repair as required. • Inspect and repair as required.
<p>Other Noises/Vibrations</p> <ul style="list-style-type: none"> • Main control valve resonance • Output shaft splines - worn or damaged • Shift cable: 	<ul style="list-style-type: none"> • Locate source of disturbance and repair as required. • Install a new output shaft.

<ul style="list-style-type: none"> ○ Vibration ○ Grounding ● Cooler lines: <ul style="list-style-type: none"> ○ Grounding 	<ul style="list-style-type: none"> ● Inspect and repair as required. ● Inspect and repair as required.
--	--

Engine Will Not Crank

ENGINE REFERENCE CHART

Possible Component	Reference/Action
257 - ROUTINE	
Powertrain Control System <ul style="list-style-type: none"> ● Electrical inputs/outputs, TCM, vehicle wiring harnesses, engine starting system, TR sensor 	<ul style="list-style-type: none"> ● Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of engine components. Check PIDs for TR park and neutral positions. Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again
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> .
External Shift Cable System <ul style="list-style-type: none"> ● Cable system - damaged, misaligned 	<ul style="list-style-type: none"> ● Inspect and repair as necessary. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> .
TR Sensor Assembly <ul style="list-style-type: none"> ● TR Assembly - damaged 	<ul style="list-style-type: none"> ● Inspect and repair as necessary.
Torque Converter <ul style="list-style-type: none"> ● Flexplate - damaged 	<ul style="list-style-type: none"> ● Inspect for damage. 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

COMPONENT REFERENCE CHART

Possible Component	Reference/Action
258 - ROUTINE	
Shift Cable <ul style="list-style-type: none"> ● Cable system - damaged, misaligned ● 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 and repair as necessary. ● Inspect for damage. If damaged, repair as necessary. ● Inspect for damage. If

<ul style="list-style-type: none"> • Transmission case assembly • Park gear, parking pawl, parking pawl return spring, part or guide, parking actuating rod, parking pawl shaft, manual lever • External linkages/brackets - damaged 	<p>damaged, repair as necessary.</p> <ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary. • Inspect for damage. If damaged, repair as necessary.
<p>TR Assembly Damaged, Manual Lever Detent Spring Damaged</p> <ul style="list-style-type: none"> • TR assembly 	<ul style="list-style-type: none"> • Install a new mechatronic assembly. Refer to <u>MAIN CONTROL VALVE BODY</u>.

Transmission Overheating

TRANSMISSION OVERHEATING

Possible Component	Reference/Action
259 - ROUTINE	
<p>Powertrain Control System</p> <ul style="list-style-type: none"> • Electrical inputs/outputs, TCM, vehicle wiring harnesses, TCC solenoid 	<ul style="list-style-type: none"> • Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of engine components. Check PIDs for TR park and neutral positions. Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.
<p>Fluid</p> <ul style="list-style-type: none"> • Incorrect level • Fluid condition 	<ul style="list-style-type: none"> • Check fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION</u>. • Carry out the fluid level check. Refer to <u>PRELIMINARY INSPECTION</u>.
<p>Case Vent Damaged</p> <ul style="list-style-type: none"> • Transmission case assembly 	<ul style="list-style-type: none"> • Inspect for damage. If damaged, repair as necessary.
<p>Torque Converter Not Engaging</p> <ul style="list-style-type: none"> • Torque converter 	<ul style="list-style-type: none"> • Install a new torque converter.
<p>Other</p> <ul style="list-style-type: none"> • Restriction in transmission cooling system • Excessive trailer tow load • Vehicle heat shield - missing or damaged 	<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. • Refer to the Owner Guide for specifications on trailer towing. • 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.
---	--

Fluid Venting/Foaming

FLUID VENTING/FOAMING

Possible Component	Reference/Action
260 - ROUTINE	
Incorrect Level <ul style="list-style-type: none"> • Fluid 	<ul style="list-style-type: none"> • Check the fluid level. Adjust fluid to correct level. Refer to <u>PRELIMINARY INSPECTION.</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.