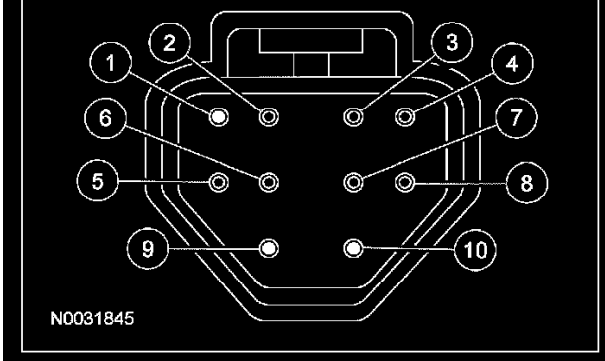
Transmission Control Systems: Symptom Related Diagnostic Procedures

Transmission Connector Layouts

Transmission Connector Layouts

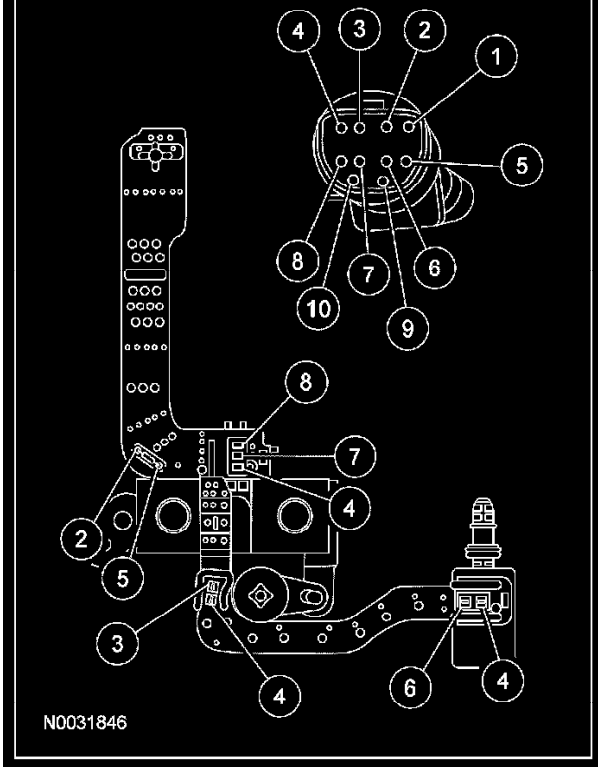
Transmission Vehicle Harness Connector



Pin Number	Circuit Function
1	NOT USED
2	Signal Return
3	Torque Converter Clutch (TCC) Solenoid
4	Vehicle Power
5	Transmission Fluid Temperature (TFT) Input
6	Electronic Pressure Control (EPC) Solenoid
7	SSA
8	SSB
9	NOT USED
10	NOT USED

Transmission Vehicle Harness Connector

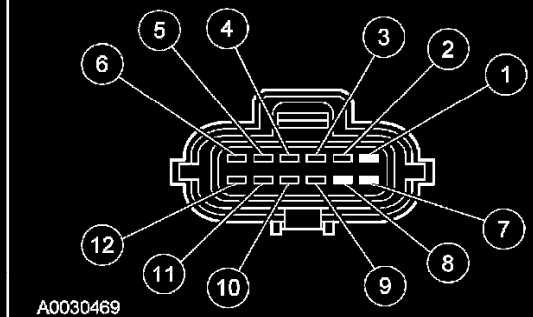
Transmission Internal Harness Connector



Pin Number	Circuit Function
1	NOT USED
2	Signal Return Transmission Fluid Temperature (TFT)
3	Torque Converter Clutch (TCC)
4	Vehicle Power To Solenoid
5	Transmission Fluid Temperature (TFT)
6	Electronic Pressure Control
7	SSA
8	SSB
9	NOT USED
10	NOT USED

Transmission Internal Harness Connector

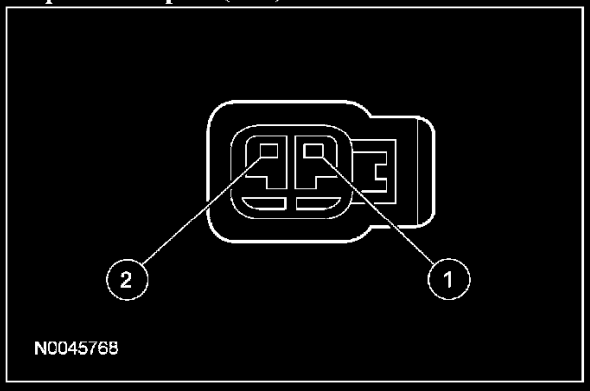
Digital Transmission Range (TR) Sensor Connector



Pin Number	Circuit Function
1	NOT USED
2	Signal Return
3	TR3A
4	TR1
5	TR2
6	TR4
7	NOT USED
8	NOT USED
9	Fused Power Feed
10	Starter Control
11	Reverse
12	Starter to Starter Interrupt Relay

Digital Transmission Range (TR) Sensor Connector

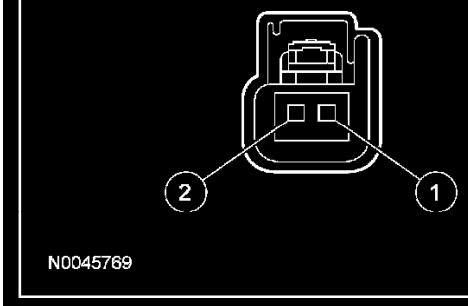
Output Shaft Speed (OSS) Sensor Harness Connector



Pin Number	Circuit Function
1	Signal Return
2	Output Shaft Speed (OSS) Sensor

Output Shaft Speed (OSS) Sensor Harness Connector

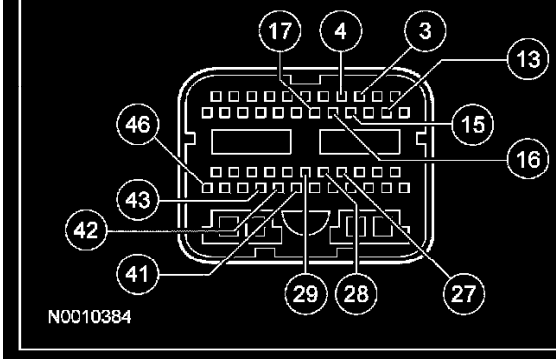
Turbine Shaft Speed (TSS) Sensor Harness Connector



Pin Number	Circuit Function
1	Turbine Shaft Speed (TSS) Sensor
2	Signal Return

Turbine Shaft Speed (TSS) Sensor Harness Connector

Powertrain Control Module (PCM) Harness Connector



Pin Number	Circuit Function
3	Output Shaft Speed (OSS) Sensor
4	Vehicle power
13	Electronic Pressure Control (EPC) Solenoid
15	Turbine Shaft Speed (TSS) Sensor
16	Transmission Range (TR) Sensor TR1
17	Transmission Range (TR) Sensor TR2
27	Transmission Range (TR) Sensor TR3A
28	Transmission Range (TR) Sensor TR4
29	Transmission Fluid Temperature (TFT) Sensor
41	Signal Return

Powertrain Control Module (PCM) Harness Connector (Part 1)

Pin Number	Circuit Function
42	Shift Solenoid 1 (SSA)
43	Shift Solenoid 2 (SSB)
46	Torque Converter Clutch (TCC)

Powertrain Control Module (PCM) Harness Connector (Part 2)

a Will read "Drive" if O/D is canceled.

A. TRV is the voltage at the PCM pin 19 (TR3A circuit) to signal return.

B. "In Between" reading could be caused by a selector lever cable or digital TR sensor misaligned or a digital TR sensor circuit failure of TR1, TR2, TR3A or TR4.

C. TRD: 1= Open Digital TR switch, 0= Closed Digital TR switch.

D. Readings taken from PCM signal pins for TR1, TR2, TR3A or TR4 to signal return.
- Voltages for TR1, TR2, TR4:
- 0 = **0.0 volt.**
- 1 = **9.0 - 14.0 volts.**
- Voltage for TR3A:
- 0 = **0.0 volt.**
- 1 = **1.3 - 1.8 volts.**

Diagnosis By Symptom

Diagnosis By Symptom

The Diagnosis by Symptom charts give the technician diagnostic information, direction, and suggest possible components, using a symptom as a starting point.

The Diagnosis by Symptom charts are divided into 2 categories: Electrical Routines, indicated by 200 series numbers, and Hydraulic/Mechanical Routines, indicated by 300 series numbers.

The Electrical Routines list the possible electrical components that could cause or contribute to the symptom described. The Hydraulic/Mechanical Routines list the possible hydraulic or mechanical components that could cause or contribute to the symptom described.

Diagnosis by Symptom Chart Directions

1. Using the Diagnosis by Symptom Index, select the Concern/Symptom 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.

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

   Begin with the Electrical Routine, if indicated. 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 Hydraulic/Mechanical Routines list possible hydraulic or mechanical components that could cause the concern. These components are listed in the removal sequence and by most probable cause. All components listed must be inspected to make sure of correct repair.

Diagnosis by Symptom Index

Diagnosis by Symptom Index

Title	Routines	
	Electrical[a]	Hydraulic/ Mechanical
Engagement Concerns		
No Forward	201	301
No Reverse	202	302
Harsh Reverse	203	303
Harsh Forward	204	304
Delayed/Soft Reverse	205	305
Delayed/Soft Forward	206	306
Shift Concerns		
Some/All Shifts Missing	210	310
Timing Concerns		
— Early/Late	211	311
— Erratic/Hunting	212	312
Feel		
— Soft/Slipping	213	313
— Harsh	214	314

Diagnosis by Symptom Index (Part 1)

Diagnosis by Symptom Index (Continued)

Title	Routines	
	Electrical[a]	Hydraulic/ Mechanical
No 1st Gear, Engages in Higher Gear	215	315
No Manual 1st Gear	216	316
No Manual 2nd Gear	217	317
Torque Converter Operation Concerns		
No Apply	240	340
Always Applied/Stalls Vehicle	241	341
Cycling/Shudder/Chatter	242	342
Other Concerns		
No Engine Braking in 2nd Gear, Manual 2nd or Manual 1st Position	250	350
Gearshift Lever Efforts High	251	351
External Leaks	252	352
Vehicle Driveability Concerns	253	353
Noise/Vibration in Forward or Reverse	254	354
Engine Will Not Crank	255	355
No Park Range	256	356
Overheating	257	357

a Carry out electrical routine first.

Diagnosis by Symptom Index (Part 2)

201/301, No Forward

Engagement Concern: No Forward

Engagement Concern: No Forward

Possible Component	Reference/Action
201 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
301 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid • Incorrect level • Condition	 • Adjust fluid to correct level. • Inspect as under Fluid Condition Check.
Shift Linkage • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After repairing transmission selector lever cable, verify the digital transmission range (TR) sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	

201/301 Engagement Concern: No Forward (Part 1)

Engagement Concern: No Forward (Continued)

Possible Component	Reference/Action
• Low forward clutch pressure, low line pressure	• Check pressure at line and forward clutch tap. If pressures are low, check the following components: oil filter and seal assembly, main controls, pump assembly, forward clutch assembly.
Fluid Filter and Seal Assembly	
• Plugged, damaged	• Install a new filter and seal assembly.
• Filter seal damaged	
Main Controls	
• 3-4 shift valve, main regulator valve, manual valve stuck, damaged	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Gaskets damaged	• Inspect gaskets for damage and install a new gasket.
• 2-3 accumulator and seals damaged	• Inspect piston, seals and bore for damage. Repair as required.
• Pressure regulator valve	• Inspect the diameter for wear.
Pump Assembly	
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Porosity/cross leaks/ball missing or leaking, plugged hole	• Inspect for porosity and leaks. Repair as required.
• No. 3 and No. 4 seal rings damaged	• Inspect seals for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect seals for damage. Repair as required.
• Check balls damaged, missing, mislocated, not seating correctly	• Inspect for mislocation, poor seating, damage. Install a new cylinder as required.
• Friction elements damaged or worn	• Check for abnormal wear, damage. Repair as required.
One-Way Clutch Assembly (Planetary)	
• Worn, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
Output Shaft	
• Damaged	• Inspect for damage. Install new components as required.

201/301 Engagement Concern: No Forward (Part 2)

202/302, No Reverse

Engagement Concern: No Reverse

Engagement Concern: No Reverse

Possible Component	Reference/Action
202 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
302 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.

202/302 Engagement Concern: No Reverse (Part 1)

Engagement Concern: No Reverse (Continued)

Possible Component	Reference/Action
• Condition	• Inspect condition of fluid.
Shift Linkage • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After repairing transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures • Low reverse clutch pressure, low reverse band pressure, low line pressure	• Check pressure at line pressure tap. If pressures are low, check the following components: oil filter and seal assembly, main controls, reverse servo, pump assembly, reverse clutch assembly.
Fluid Filter and Seal Assembly • Plugged, damaged	• Install a new filter and seal assembly.
Main Controls • No. 6 shuttle ball, manual valve, main regulator valve, 1-2 accumulator seals stuck or damaged • Loose bolts • Gasket damaged	• Inspect for damage. Repair as required. • Tighten bolts to specifications. • Inspect for damage and install a new gasket.
Low/Reverse Servo • Seals (piston and cover) damaged • Servo cover retaining ring damaged • Anchor pins (case) damaged	• Inspect for damage. Repair as required.
Pump Assembly • Loose bolts • Porosity/cross leaks/ball missing or leaking, plugged hole • Gasket damaged • No. 1 and 2 seal rings damaged	• Tighten bolts to specifications. • Inspect pump assembly. Install new as required. • Inspect for damage and install a new gasket. • Inspect for damage. Repair as required.
Reverse Clutch Assembly • Seals, piston damaged • Check ball missing or damaged • Friction elements damaged or worn	• Inspect for damage. Repair as required.
Low/Reverse Band • Band, servo, anchor pins damaged or worn	• Inspect for damage. Repair as required.

202/302 Engagement Concern: No Reverse (Part 2)

203/303, Harsh Reverse

Engagement Concern: Harsh Reverse

Engagement Concern: Harsh Reverse

Possible Component	Reference/Action
203 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, PCM, TFT sensor, EPC solenoid	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. Carry out engagement test, EPC test and GO to Pinpoint Test B or GO to Pinpoint Test D. Check idle speed. Repair as required. Clear DTCs, road test and repeat the self-test.
303 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid • Incorrect level • Condition	• Adjust fluid to correct level. • Inspect condition of fluid.
Engine Driveline • Looseness in the driveshaft, U-joints or the engine mounts	• Repair as required.
Shift Linkage • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After repairing transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures • High line pressure, high EPC pressure	• Check pressure at line and EPC pressure taps. If high, check the following components: main controls, oil filter and seal assembly.
Fluid Filter and Seal Assembly • Plugged or damaged • Filter seal damaged	• Install a new filter and seal assembly.
Main Controls • No. 6 shuttle ball, No. 5 check ball, manual valve, main regulator valve stuck, damaged or missing • Bolts not tightened to specifications • Gasket damaged • EPC solenoid stuck or damaged	• Inspect for damage. Repair as required. • Tighten bolts to specifications. • Inspect for damage and install a new gasket. • Inspect for damage, contamination. Carry out EPC test in Routine No. 203. Repair as required.
Low Reverse Servo • Seals (piston and cover) damaged • Servo cover retaining ring assembled incorrectly • Anchor pins (case) damaged	• Inspect for damage. Repair as required.
Pump Assembly	

203/303 Engagement Concern: Harsh Reverse (Part 1)

Engagement Concern: Harsh Reverse (Continued)

Possible Component	Reference/Action
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Porosity/cross leaks	• Inspect pump assembly. Install new as required.
• Gasket damaged	• Inspect for damage and install a new gasket.
• No. 1 and No. 2 seal rings damaged	• Inspect for damage. Repair as required.
Reverse Clutch Assembly • Seals, piston damaged • Check ball missing or damaged • Friction elements damaged, worn • Return spring piston damaged, worn	• Inspect for damage. Repair as required.
Low Reverse Band • Band, servo, anchor pin damaged or worn	• Inspect for damage. Repair as required.

203/303 Engagement Concern: Harsh Reverse (Part 2)

204/304, Harsh Forward

Engagement Concern: Harsh Forward

Engagement Concern: Harsh Forward

Possible Component	Reference/Action
204 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, PCM, TFT sensor, EPC solenoid	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. Carry out engagement test and EPC test. GO to Pinpoint Test B or GO to Pinpoint Test D. Check idle speed. Repair as required. Clear DTCs, road test and repeat self-test.
304 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid • Incorrect level • Condition	• Adjust fluid to correct level. • Inspect condition of fluid.
Engine Driveline • Looseness in the driveshaft, U-joints or the engine mounts	• Repair as required.
Incorrect Pressures • High forward clutch pressure, high line pressure, high EPC pressure	• Check pressure at line, EPC and forward pressure taps. If pressures are high, check the following possible components: main controls, pump assembly.
Main Controls • Main regulator valve stuck, damaged • Bolts not tightened to specifications • Gaskets damaged • EPC solenoid stuck or damaged	• Inspect and repair as required. • Tighten bolts to specifications. • Inspect for damage and install a new gasket. • Inspect for damage or contamination. Carry out EPC test in Routine 204. Repair as required.

204/304 Engagement Concern: Harsh Forward (Part 1)

Engagement Concern: Harsh Forward (Continued)

Possible Component	Reference/Action
Case	
• 2-3 accumulator seal/retainer stuck, damaged	• Inspect for damage. Repair as required.
Pump Assembly	
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Porosity/cross leaks	• Inspect for porosity/leaks. Install a new pump as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Forward Clutch Assembly	
• Check balls missing or damaged	• Inspect for mislocation, poor seating, damage. Install a new forward clutch cylinder.
• Friction element damaged or worn	• Inspect for damage. Repair as required.
• Forward clutch wave spring damaged	• Inspect for damage. Repair as required.
• Forward clutch return spring damaged	• Inspect for damage. Repair as required.

204/304 Engagement Concern: Harsh Forward (Part 2)

205/305, Delayed/Soft Reverse

Engagement Concern: Delayed/Soft Reverse

Engagement Concern: Delayed/Soft Reverse

Possible Component	Reference/Action
205 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
305 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After repairing transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	
• Low reverse clutch pressure, low reverse band pressure, low line pressure	• Check pressure at line tap. If pressures are low, check the following components: main controls, pump assembly, reverse clutch assembly, reverse servo.
Fluid Filter and Seal Assembly	
• Plugged, damaged • Filter seal damaged	• Install a new filter and seal assembly.
Main Controls	
• No. 6 shuttle ball, manual valve, main regulator valve stuck or damaged	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.

205/305 Engagement Concern: Delayed/Soft Reverse (Part 1)

Engagement Concern: Delayed/Soft Reverse (Continued)

Possible Component	Reference/Action
• Gaskets damaged	• Inspect for damage and install a new gasket.
Case	
• 1-2 accumulator seals stuck or damaged	• Inspect for damage. Repair as required.
Low Reverse Servo	
• Seals (piston and cover) damaged	• Inspect for damage. Repair as required.
• Servo cover retaining ring assembled incorrectly	
Pump Assembly	
• Bolts not tightened to specification	• Tighten bolts to specification.
• Porosity/cross leaks/ball missing or leaking	• Inspect pump assembly. Install new as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• No. 1 and No. 2 seal rings damaged	• Inspect for damage. Repair as required.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Install new components as required.
• Check ball missing or damaged	
• Friction elements damaged, worn	
• Return spring and piston damaged, worn	
Low Reverse Band	
• Damaged, worn	• Inspect for damage. Repair as required.

205/305 Engagement Concern: Delayed/Soft Reverse (Part 2)

206/306, Delayed/Soft Forward

Engagement Concern: Delayed/Soft Forward

Engagement Concern: Delayed/Soft Forward

Possible Component	Reference/Action
206 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
306 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	

206/306 Engagement Concern: Delayed/Soft Forward (Part 1)

Engagement Concern: Delayed/Soft Forward (Continued)

Possible Component	Reference/Action
• Low forward clutch pressure, low line pressure, low EPC pressure	• Check pressure at line, forward clutch and EPC taps. If pressures are low, check the following components: oil filter and seal assembly, main controls and pump assembly.
Fluid Filter and Seal Assembly	
• Plugged, damaged	• Install a new filter and seal assembly.
• Filter seal damaged	
Main Controls	
• 3-4 shift valve, main regulator valve stuck or damaged	• Inspect and repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Gaskets damaged	• Inspect for damage and repair as required.
Case	
• 2-3 or 1-2 accumulator, bore damaged or stuck	• Inspect for damage. Repair as required.
Pump Assembly	
• Bolts not tightened to specification	• Tighten bolts to specifications.
• Porosity/cross leaks	• Inspect pump assembly. Repair as required.
• Gaskets damaged	• Inspect for damage. Repair as required.
• No. 3 and No. 4 seal rings damaged	• Inspect for damage. Repair as required.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as required.
• Check balls missing, damaged	• Inspect for mislocation, poor seating, damage. Install a new cylinder as required.
• Friction elements damaged, worn	• Check for damage. Repair as required.

206/306 Engagement Concern: Delayed/Soft Forward (Part 2)

210/310, Some/All Shifts Missing

Shift Concerns: Some/All Shifts Missing

Shift Concerns: Some/All Shifts Missing

Possible Component	Reference/Action
210 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, output shaft speed (OSS) sensor, digital TR sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A, GO to Pinpoint Test C or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat the self-test.
310 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Shift Linkage, Digital TR Sensor	

210/310 Shift Concerns: Some/All Shifts Missing (Part 1)

Shift Concerns: Some/All Shifts Missing (Continued)

Possible Component	Reference/Action
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. Refer to Transmission Range (TR) Sensor Adjustment • Refer to the following shift routine(s) for further diagnosis: — Shift 1-2, Routine 220/320 — Shift 2-3, Routine 221/321 — Shift 3-4, Routine 222/322 — Shift 4-3, Routine 223/323 — Shift 3-2, Routine 224/324 — Shift 2-1, Routine 225/325

210/310 Shift Concerns: Some/All Shifts Missing (Part 2)

211/311, Timing Concerns - Early/Late

Shift Concerns: Timing Concerns - Early/Late

Shift Concerns: Timing Concerns — Early/Late

Possible Component	Reference/Action
211 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, EPC solenoid, TFT sensor, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A, GO to Pinpoint Test C or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat the self-test.
311 — HYDRAULIC/MECHANICAL ROUTINE	
Other • Tire size change, axle ratio change	• Verify vehicle has original equipment. Refer to Certification Label and Safety Standard Certification Label. Changes in tire size or axle ratio will affect shift timing.
Fluid • Incorrect level • Condition	• Adjust fluid to correct level. • Inspect condition of fluid.
Powertrain Control System • Engine driveability concerns	• Refer to Routine 253.
Incorrect Pressures	

211/311 Shift Concerns: Timing Concerns - Early/Late (Part 1)

Shift Concerns: Timing Concerns — Early/Late (Continued)

Possible Component	Reference/Action
• Line pressure, EPC pressure	• Check pressure at line and EPC taps. If not OK, check the main controls. If OK, refer to the shift routine(s) for further diagnosis: — Shift 1-2, Routine 320 — Shift 2-3, Routine 321 — Shift 3-4, Routine 322 — Shift 4-3, Routine 323 — Shift 3-2, Routine 324 — Shift 2-1, Routine 325
Main Controls	
• EPC solenoid, stuck or damaged hydraulically or mechanically	• Inspect for damage, contamination. Carry out EPC tests in Routine No. 211. Repair as required.
• Valves, accumulators, seals stuck or damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• Solenoid screen blocked or damaged	• Clean or install a new screen.

211/311 Shift Concerns: Timing Concerns - Early/Late (Part 2)

212/312, Timing Concerns - Erratic/Hunting

Shift Concerns: Timing Concerns - Erratic/Hunting

Shift Concerns: Timing Concerns — Erratic/Hunting

Possible Component	Reference/Action
212 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, torque converter clutch (TCC) solenoid, digital TR sensor, output shaft speed (OSS)	• Carry out self-test. Refer to Computer and Control Systems for diagnosis. GO to Pinpoint Test A, GO to Pinpoint Test C or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Poor engine performance	• Refer to Routine 253.
312 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Main Controls	
• Valves, accumulators, seals, assembled wrong, stuck or damaged	• Inspect for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• Solenoid screen blocked or damaged	• Clean or install a new screen.
Torque Converter Clutch	
• Torque converter	• Refer to Torque Converter Operation Concerns: Cycling/Shudder/Chatter Hydraulic/Mechanical Routine 342.

212/312 Shift Concerns: Timing Concerns - Erratic/Hunting (Part 1)

Shift Concerns: Timing Concerns — Erratic/Hunting (Continued)

Possible Component	Reference/Action
Specific Shifts	• Refer to the following shift routine(s) for further diagnosis: — Shift 1-2, Routine 320 — Shift 2-3, Routine 321 — Shift 3-4, Routine 322 — Shift 4-3, Routine 323 — Shift 3-2, Routine 324 — Shift 2-1, Routine 325

212/312 Shift Concerns: Timing Concerns - Erratic/Hunting (Part 2)

213/313, Feel - Soft/Slipping

Shift Concerns: Feel - Soft/Slipping

Shift Concerns: Feel — Soft/Slipping

Possible Component	Reference/Action
213 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, EPC solenoid, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test D or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Engine driveability concerns	• Refer to Routine 253.
313 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Incorrect Pressures	
• Low line pressure, low EPC pressure	• Check pressures at line and EPC taps. If pressures are low or all shifts are soft/slipping, go to main controls. If pressures are OK and a specific shift is soft/slipping, refer to the following routine(s) for further diagnosis: — Shift 1-2, Routine 320 — Shift 2-3, Routine 321 — Shift 3-4, Routine 322 — Shift 4-3, Routine 323 — Shift 3-2, Routine 324 — Shift 2-1, Routine 325
Main Controls	
• Main regulator valve, overdrive servo regulator valve stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• EPC solenoid stuck or damaged	• Inspect for damage and contamination. Carry out EPC tests in Routine 213. Repair as required.
Case	
• 1-2 accumulator stuck or damaged	• Inspect for damage. Repair as required.
Filter and Seal Assembly	

213/313 Shift Concerns: Feel - Soft/Slipping (Part 1)

Shift Concerns: Feel — Soft/Slipping (Continued)

Possible Component	Reference/Action
• Filter plugged, damaged	• Inspect for damage. Install a new filter as required.
• Seal damaged or cut	• Inspect for damage. Install new as required.

213/313 Shift Concerns: Feel - Soft/Slipping (Part 2)

214/314, Feel - Harsh

Shift Concerns: Feel - Harsh

Shift Concerns: Feel — Harsh

Possible Component	Reference/Action
214 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, EPC solenoid, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test D or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Engine driveability concerns	• Refer to Routine 253.
314 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Incorrect Pressures	
• High line pressure, high EPC pressure	• Check pressures at line and EPC taps. If pressures are high or all shifts are harsh, go to Main Controls. If pressures are OK and a specific shift is harsh, refer to the following shift routine(s) for further diagnosis: — Shift 1-2, Routine 320 — Shift 2-3, Routine 321 — Shift 3-4, Routine 322 — Shift 4-3, Routine 323 — Shift 3-2, Routine 324 — Shift 2-1, Routine 325
Main Controls	
• Main regulator valve, overdrive servo regulator valve stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• EPC solenoid stuck or damaged	• Inspect for damage or contamination. Carry out EPC tests in Routine 214. Repair as required.

214/314 Shift Concerns: Feel - Harsh

215/315, No 1st Gear, Engages In Higher Gear

Shift Concerns: No 1st Gear, Engages In Higher Gear

Shift Concerns: No 1st Gear, Engages In Higher Gear

Possible Component	Reference/Action
215 — ELECTRICAL ROUTINE	
Powertrain Control System	

215/315 Shift Concerns: No 1st Gear, Engages In Higher Gear (Part 1)

Shift Concerns: No 1st Gear, Engages In Higher Gear (Continued)

Possible Component	Reference/Action
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, digital transmission range TR sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test C. Repair as required. Clear DTCs, road test and repeat self-test.
315 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. Refer to Transmission Range (TR) Sensor Adjustment
Incorrect Pressures • Low reverse clutch pressure, low reverse band pressure, low line pressure • Forward Off, Intermediate Off, Direct X • Forward Off, Intermediate X, Direct Off • Forward Off, Intermediate X, Direct X • Forward X, Intermediate Off, Direct X • Forward X, Intermediate X, Direct Off • Forward X, Intermediate X, Direct X • Forward X, Intermediate Off, Direct Off	• Check for which pressures are on and refer to Band and Clutch Application Chart and corresponding routines. — 324, 301 — 325, 301 — 323, 324, 325, 301 — 324 — 325 — 323, 324, 325 — Refer to appropriate mechanical diagnosis.
Mechanical • Bands, clutches or seals damaged or worn	• Refer to Transmission Disassembly and Transmission Assembly

X = pressure applied

215/315 Shift Concerns: No 1st Gear, Engages In Higher Gear (Part 2)

216/316, No Manual 1st Gear

Shift Concerns: No Manual 1st Gear

Shift Concerns: No Manual 1st Gear

Possible Component	Reference/Action
216 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, digital TR sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test C. Repair as required. Clear DTCs, road test and repeat self-test.
316 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Cable, Digital TR Sensor	

216/316 Shift Concerns: No Manual 1st Gear (Part 1)

Shift Concerns: No Manual 1st Gear (Continued)

Possible Component	Reference/Action
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures • Low reverse clutch pressure, low reverse band pressure, low line pressure, low EPC pressure	• Check pressure at line and EPC pressure taps. If pressures are low, check the following components: oil filter and seal assembly, main controls, reverse clutch assembly and reverse servo assembly.
Fluid Filter and Seal Assembly • Plugged or damaged	• Install a new filter and seal assembly.
Main Controls • No. 6 shuttle ball, manual valve, main regulator valve, low servo modulator valve stuck, damaged or assembled incorrectly • Bolts not tightened to specifications • Gaskets damaged	• Inspect for damage. Repair as required. • Tighten bolts to specifications. • Inspect for damage and install a new gasket.
Low Reverse Servo • Seals (piston and cover) damaged	• Inspect for damage. Repair as required. • Servo cover retaining ring assembled incorrectly. • Anchor pins (case) damaged.

216/316 Shift Concerns: No Manual 1st Gear (Part 2)

217/317, No Manual 2nd Gear

Shift Concerns: No Manual 2nd Gear

Shift Concerns: No Manual 2nd Gear

Possible Component	Reference/Action
217 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, digital TR sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test C. Repair as required. Clear DTCs, road test and repeat self-test.
317 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Cable, Digital TR Sensor	

217/317 Shift Concerns: No Manual 2nd Gear (Part 1)

Shift Concerns: No Manual 2nd Gear (Continued)

Possible Component	Reference/Action
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. Refer to Transmission Range (TR) Sensor Adjustment
Main Controls	
• 3-4 shift valve, 1-2 and 2-3 shift valve, 3-4 capacity modulator valve stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Gaskets damaged	• Inspect for damage and install a new gasket.

217/317 Shift Concerns: No Manual 2nd Gear (Part 2)

220/320, 1-2 Shift (Automatic)

Shift Concerns: 1-2 Shift (Automatic)

Shift Concerns: 1-2 Shift (Automatic)

Possible Component	Reference/Action
220 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Poor engine driveability concerns	• Refer to Routine 253.
320 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. Refer to Transmission Range (TR) Sensor Adjustment
Incorrect Pressures	
• Intermediate clutch pressure, line pressure	• Check pressure at line and intermediate clutch taps. If not OK, check the main controls.
Main Controls	
• 1-2 shift valve, stuck or damaged	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specification.

220/320 Shift Concerns: 1-2 Shift (Automatic Part 1)

Shift Concerns: 1-2 Shift (Automatic) (Continued)

Possible Component	Reference/Action
• Shift solenoid SSA malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gasket damaged	• Inspect for damage and install a new gasket.
• No. 8 ball not seating	• Inspect for damage. Repair as required.
Case	
• 1-2 accumulator stuck or damaged	• Inspect for damage. Repair as required.
Pump	
• Porosity/cross leaks, balls missing, damaged or leaking	• Inspect for porosity/leaks, balls missing. Install a new pump as required.
• Gasket damaged	• Inspect for damage and install a new gasket.
Intermediate Clutch Assembly	
• Seals damaged	• Inspect for damage. Repair as required.
• Piston damaged	• Inspect for damage. Repair as required.
• Friction elements damaged or worn	• Inspect for damage. Repair as required.
Intermediate One-Way Clutch Assembly	
• Not holding or damaged	• Inspect for damage. Repair as required.
Planetary One-Way Clutch Assembly	
• Not overrunning or damaged	• Inspect for damage. Repair as required.
1-2 Accumulator	
• Damaged accumulator piston	• Inspect for damage. Repair as required.
• Springs damaged or broken	• Inspect for damage. Repair as required.
• Case bore scored	• Inspect for damage. Repair as required.

220/320 Shift Concerns: 1-2 Shift (Automatic Part 2)

221/321, 2-3 Shift (Automatic)

Shift Concerns: 2-3 Shift (Automatic)

Shift Concerns: 2-3 Shift (Automatic)

Possible Component	Reference/Action
221 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat the self-test.
• Engine driveability concerns	• Refer to Routine 253.
321 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage	

221/321 Shift Concerns: 2-3 Shift (Automatic Part 1)

Shift Concerns: 2-3 Shift (Automatic) (Continued)

Possible Component	Reference/Action
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	
• Direct clutch pressure	• Check pressure at direct clutch tap. Refer to the Clutch Pressure Chart for specifications. If not OK, check the main controls.
Main Controls	
• 2-3 shift valve, check ball No. 9 or No. 3, solenoid pressure regulator valve, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Shift solenoid SSB malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• Output shaft seals damaged or cup plug leaking or missing	• Inspect for damage and repair as required.
• 2-3 accumulator damaged or stuck	• Inspect piston seal and bore for damage. Repair as required.
• Solenoid screen (in main control) blocked or damaged	• Clean or install a new screen.
Intermediate One-Way Clutch Assembly	
• Not overrunning or damaged	• Inspect for damage. Repair as required.
Output Shaft	
• Seal rings damaged • Cup plug damaged or missing	• Inspect for damage. Repair as required.
Direct Clutch Assembly	
• Seals or piston damaged	• Inspect for damage. Repair as required.
• Friction elements worn or damaged	• Inspect for damage. Repair as required.
• Check ball not seating	• Inspect for damage. Repair as required.
• Return spring assembly damaged	• Inspect for damage. Repair as required.
Case	
• Output shaft rear seals leaking or damaged	• Inspect for damage. Repair as required. Inspect case for damaged seal area. If damaged, install a new case.
2-3 Accumulator	
• Damaged accumulator piston	• Inspect for damage. Repair as required.
• Springs damaged or broken	• Inspect for damage. Repair as required.
• Case bore scored	• Inspect for damage. Repair as required.

221/321 Shift Concerns: 2-3 Shift (Automatic Part 2)

222/322, 3-4 Shift (Automatic)

Shift Concerns: 3-4 Shift (Automatic)

Shift Concerns: 3-4 Shift (Automatic)

Possible Component	Reference/Action
222 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, OSS, transmission control (TC) switch	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A or GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Engine driveability concerns	• Refer to Routine 253.
322 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. Refer to Transmission Range (TR) Sensor Adjustment
Incorrect Pressures	
• Forward clutch pressure, direct clutch pressure, line pressure	• Check line, direct and forward clutch pressures at appropriate taps. If pressures are out of specification, check main controls.
Main Controls	
• 3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator valve, 1-2 and 2-3 shift valves stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• SSA or SSB malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• OD servo rod and piston cushion spring or seals damaged	• Inspect for damage. Repair as required.
• Worn or damaged OD servo anchor pins	• Inspect for damage. Repair as required.
• No. 2, No. 4, No. 7 and No. 9 check balls damaged or missing	• Inspect for damage. Repair as required.
• Solenoid screen blocked or damaged	• Clean or install a new screen.
Pump	
• Porosity/cross leaks, balls missing, damaged or leaking	• Inspect for porosity/leaks, balls missing. Install a new pump as required.
• Gaskets damaged	• Inspect for damage. Install new gaskets as required.
OD Band	

222/322 Shift Concerns: 3-4 Shift (Automatic Part 1)

Shift Concerns: 3-4 Shift (Automatic) (Continued)

Possible Component	Reference/Action
• OD band and reverse clutch drum assembly damaged, worn or assembled incorrectly	• Inspect for damage. Repair as required.
• Intermediate one-way clutch assembly damaged	• Inspect for damage. Repair as required.
Forward Clutch Assembly	
• Seals or piston damaged	• Inspect for damage. Repair as required.
• Friction elements worn or damaged	• Inspect for damage. Repair as required.
• Check ball stuck, damaged or not seating correctly	• Inspect for damage. Repair as required.
Input Shaft	
• Seals damaged	• Inspect for damage. Repair as required.

222/322 Shift Concerns: 3-4 Shift (Automatic Part 2)

223/323, 4-3 Shift (Automatic)

Shift Concerns: 4-3 Shift (Automatic)

Shift Concerns: 4-3 Shift (Automatic)

Possible Component	Reference/Action
223 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, transmission control (TC) switch	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A. Repair as required. Clear DTCs, road test and repeat self-test.
323 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
• Forward clutch pressure, line pressure	• Check line and forward clutch at pressure taps. If out of specification, check the main controls.
Main Controls	
• 3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator, 1-2 and 2-3 shift valves stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Check balls No. 2, No. 7, No. 9 damaged, missing or not seating correctly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specification.
• SSA malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• OD servo, seal, rod damaged	• Inspect for damage. Repair as required.
• Solenoid screen blocked or damaged	• Clean or install a new screen.
Pump	
• Porosity/cross leaks, balls missing, damaged or leaking	• Inspect for porosity/leaks, balls missing. Install a new pump as required.
• Seal rings damaged	• Inspect for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.

223/323 Shift Concerns: 4-3 Shift (Automatic Part 1)

Shift Concerns: 4-3 Shift (Automatic) (Continued)

Possible Component	Reference/Action
Overdrive Band	
• OD band and reverse clutch assembly damaged, worn or assembled incorrectly	• Inspect for damage. Repair as required.
• Intermediate one-way clutch assembly damaged	• Inspect for damage. Repair as required.
Forward Clutch Assembly	
• Seals or piston damaged	• Inspect for damage. Repair as required.
• Friction elements damaged, worn	• Inspect for damage. Repair as required.
• Check ball stuck, damaged or not seating correctly	• Inspect for damage. Repair as required.
• Forward clutch piston and return spring damaged	• Inspect for damage. Repair as required.
Input Shaft	
• Seals damaged	• Inspect for damage. Repair as required.

223/323 Shift Concerns: 4-3 Shift (Automatic Part 2)

224/324, 3-2 Shift (Automatic)

Shift Concerns: 3-2 Shift (Automatic)

Shift Concerns: 3-2 Shift (Automatic)

Possible Component	Reference/Action
224 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A. Repair as required. Clear DTCs, road test and repeat self-test.
324 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
• Direct clutch	• Check pressure at direct clutch tap. If not within specification, check the main controls.
Main Controls	
• 2-3 shift valve stuck or damaged	• Inspect for damage. Repair as required.
• Check balls damaged or missing	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• SSB malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Intermediate One-Way Clutch	
• Not holding or damaged	• Inspect for damage. Repair as required.
• Intermediate one-way retaining clutch snap ring not seated	• Inspect for damage. Repair as required.
Direct Clutch Assembly	
• Seals or piston damaged	• Inspect for damage. Repair as required.
• Friction element damaged, worn	• Inspect for damage. Repair as required.
• Check ball stuck, damaged or not seating correctly	• Inspect for damage. Repair as required.

224/324 Shift Concerns: 3-2 Shift (Automatic)

225/325, 2-1 Shift (Automatic)

Shift Concerns: 2-1 Shift (Automatic)

Shift Concerns: 2-1 Shift (Automatic)

Possible Component	Reference/Action
225 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A. Repair as required. Clear DTCs, road test and repeat self-test.
325 — HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures	
• Intermediate clutch	• Check pressure at intermediate clutch tap. Refer to the Clutch Pressure Chart for specifications. If not within specifications, check main controls and pump.
Main Controls	
• 1-2 shift valve, 1-2 accumulator solenoid pressure regulator valve stuck, damaged or assembled wrong	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• SSA malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage; repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Pump	
• Gaskets damaged	• Inspect for damage and install a new gasket.
• Porosity/cross leaks	• Inspect for leak/porosity. Install a new pump as required.
Intermediate Clutch Assembly	
• Piston damaged	• Inspect for damage. Repair as required.
• Friction elements damaged, worn	• Inspect for damage. Repair as required.
• End clearance incorrect	• Inspect and correct. Refer to Transmission Assembly in this section.
Intermediate One-Way Clutch	
• Damaged	• Inspect for damage. Repair as required.
• Intermediate one-way clutch retaining snap ring not seated	• Inspect for damage. Repair as required.
Planetary One-Way Clutch	
• Not holding or damaged	• Inspect for damage. Repair as required.

225/325 Shift Concerns: 2-1 Shift (Automatic)

240/340, No Apply

Torque Converter Clutch Operation Concerns: No Apply

Torque Converter Clutch Operation Concerns: No Apply

Possible Component	Reference/Action
240 — ELECTRICAL ROUTINE	
Powertrain Control System	

240/340 Torque Converter Clutch Operation Concerns: No Apply (Part 1)

Torque Converter Clutch Operation Concerns: No Apply (Continued) for diagnosis of PCM.

Possible Component	Reference/Action
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, torque converter clutch (TCC) solenoid, TFT sensor, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test B or GO to Pinpoint Test E. Repair as required. Clear codes, road test and repeat self-test.
340 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	
• Low line pressure, low EPC pressure	• Check pressure at line and EPC taps. If pressure is low, check EPC and main regulator valve. If within specifications, check the main controls.
Main Controls	
• Solenoid pressure regulator valve, manual valve, bypass clutch control valve and plunger, converter pressure limit valve, drain back valve stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Solenoid screen blocked or damaged	• Clean or install a new screen.
• TCC solenoid malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Pump Assembly	
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Porosity/cross leaks, balls leaking	• Inspect for porosity/leaks, ball missing. Install a new pump as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Input Shaft	
• Seals damaged	• Inspect for damage. Repair as necessary.
Torque Converter Assembly	
• Leakage, friction material damaged, internal seals damaged	• Inspect torque converter. Repair or install a new or remanufactured torque converter as required.

240/340 Torque Converter Clutch Operation Concerns: No Apply (Part 2)

241/341, Always Applied/Stalls Vehicle

Torque Converter Clutch Operation Concerns: Always Applied/Stalls Vehicle

Torque Converter Clutch Operation Concerns: Always Applied/Stalls Vehicle

Possible Component	Reference/Action
241 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, torque converter clutch (TCC) solenoid, TFT sensor	• Carry out self-test. Refer to the Computers and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test B or GO to Pinpoint Test A. Repair as required. Clear DTCs, road test and repeat self-test.
341 — HYDRAULIC/MECHANICAL ROUTINE	
Main Control	
• Drain back valve, torque converter clutch (TCC) and plunger stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• TCC solenoid malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• No. 7 ball incorrect seating	• Inspect for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Pump Assembly	
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Ball missing, leaking, porosity/cross leaks	• Inspect for porosity/leaks, balls missing. Install a new pump as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Input Shaft	
• Seals damaged	• Inspect for damage. Repair as required.
Torque Converter Assembly	
• No end clearance	• Inspect converter and install a new or remanufactured torque converter as required.
• Piston plate damaged or stuck to cover	• If cover is heat-stained, install a new converter and determine the cause of the overheat condition.

241/341 Torque Converter Clutch Operation Concerns: Always Applied/Stalls Vehicle

242/342, Cycling/Shudder/Chatter

Torque Converter Clutch Operation Concerns: Cycling/Shudder/Chatter

Torque Converter Clutch Operation Concerns: Cycling/Shudder/Chatter

Possible Component	Reference/Action
242 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, torque converter clutch (TCC) solenoid, OSS	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test E. Repair as required. Clear DTCs, road test and repeat self-test.
• Speed control equipped vehicles	• Evaluate with speed control off.
342 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	

242/342 Torque Converter Clutch Operation Concerns: Cycling/Shudder/Chatter (Part 1)

Torque Converter Clutch Operation Concerns: Cycling/Shudder/Chatter (Continued)

Possible Component	Reference/Action
• Condition	• Inspect fluid condition. If burnt, drain fluid and converter. Install a new fluid and filter assembly. Bring vehicle to normal operating temperature. Carry out the Transmission Drive Cycle Test. Carry out Transmission Self-Test. If condition still exists, continue diagnostics.
Main Controls	
• Solenoid pressure regulator valve, No. 7 check ball, bypass clutch control valve and plunger, converter pressure limit valve stuck, damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Solenoid screen blocked or damaged	• Clean or install a new screen.
• TCC solenoid malfunction	• Activate solenoid using scan tool. If solenoid operation cannot be felt when placing hand on solenoid, install a new solenoid. Inspect O-rings for damage. Repair as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Pump Assembly	
• Bolts not tightened to specification	• Tighten bolts to specification.
• Porosity/cross leaks, missing balls or leaking	• Inspect for porosity/leaks or missing balls. Install a new pump as required.
• Gaskets damaged	• Inspect for damage and install a new gasket.
Input Shaft	
• Seals damaged	• Inspect for damage. Repair as required.
Torque Converter	
• Excessive end clearance	• Inspect converter. Install a new or remanufactured torque converter as required.

242/342 Torque Converter Clutch Operation Concerns: Cycling/Shudder/Chatter (Part 2)

250/350, No Engine Braking In Manual 2nd Or Manual 1st Position

Other Concerns: No Engine Braking In Manual 2nd Or Manual 1st Position

Other Concerns: No Engine Braking In Manual 2nd Or Manual 1st Position

Possible Component	Reference/Action
250 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
350 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Main Controls	

250/350 Other Concerns: No Engine Braking In Manual 2nd Or Manual 1st Position (Part 1)

Other Concerns: No Engine Braking In Manual 2nd Or Manual 1st Position (Continued)

Possible Component	Reference/Action
• 3-4 shift valve, 1-2 and 2-3 shift valve, gaskets, 3-4 capacity modulator valve, stuck or damaged or assembled incorrectly	• Inspect for damage. Repair as required.
• OD servo assembly damaged or stuck in manual 2nd only.	• Inspect cover, piston and seal for damage. Repair as required.
• Low/Reverse servo assembly damaged or stuck in manual 1st only	• Inspect cover, piston and seal for damage. Repair as required.
Overdrive	
• Reverse band, manual 1st (only) damaged	• Inspect for damage. Repair as required.
• OD band, reverse clutch drum assembly worn or damaged (manual 2nd only)	• Inspect for damage. Repair as required.
Reverse Band (Manual 1st Only)	
• Damaged or incorrectly adjusted	• Inspect for damage. Repair as required.

250/350 Other Concerns: No Engine Braking In Manual 2nd Or Manual 1st Position (Part 2)

251/351, Shift Lever Efforts High

Other Concerns: Shift Lever Efforts High

Other Concerns: Shift Lever Efforts High

Possible Component	Reference/Action
251 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
351 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
• Brake shift interlock system, solenoid damaged	• Refer to Transmission Control System.
Manual Lever	
• Retaining pin damaged, nut loose, detent spring bent or damaged or PARK mechanism damaged	• Inspect for damage. Repair as required.
Main Controls	
• Manual valve stuck or damaged	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.

251/351 Other Concerns: Shift Lever Efforts High

252/352, External Leaks

Other Concerns: External Leaks

Other Concerns: External Leaks

Possible Component	Reference/Action
252 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, sensor seals leaking (digital TR, OSS, vehicle speed sensor VSS, if equipped, or transmission connector)	• Inspect for leakage and repair as required.
352 — HYDRAULIC/MECHANICAL ROUTINE	

252/352 Other Concerns: External Leaks (Part 1)

Other Concerns: External Leaks (Continued)

Possible Component	Reference/Action
Case • Case vent, case porosity, case cracked	• Check the vent for free breathing. Check the fluid level. Check the transmission for overheat conditions. Repair as required.
Seals/Gaskets • Leakage at gaskets, seals, etc. (refer to external sealing illustration for potential leak locations)	• Remove all traces of lubricant on exposed surfaces of the transmission. Check the vent for free breathing. Operate the transmission at normal temperatures and perform fluid leakage check. Repair as required.
Other • Cooler fitting, cooler lines pressure tap, converter drain plug, band anchor pins	• Locate the source of the leak. Repair as required.

252/352 Other Concerns: External Leaks (Part 2)

253/353, Poor Vehicle Performance

Other Concerns: Poor Vehicle Performance

Other Concerns: Poor Vehicle Performance

Possible Component	Reference/Action
253 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, shift solenoids, digital TR sensor, torque converter clutch (TCC) solenoid, transmission fluid temperature (TFT) sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test A, GO to Pinpoint Test B or GO to Pinpoint Test C. Repair as required. Clear codes, road test and repeat self-test. Also refer to Routines 241/341 Torque Converter Operation Concern: Always Applied.
• Engine driveability concerns	• Inspect air intake/air filter system. Check the fuel system and fuel pressure. Refer to Computers and Control Systems. Inspect the exhaust system for restriction. Refer to Exhaust.
353 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Verify Correct Shift Scheduling and Engagements	
• See Reference/Action	• Go to the appropriate diagnostic routines.
Torque Converter Clutch Always Applied	
• See Reference/Action	• Go to Hydraulic/Mechanical Routine 241/341.
Torque Converter Clutch	
• Damaged	• Inspect torque converter. Install a new or remanufactured torque converter as outlined.

253/353 Other Concerns: Poor Vehicle Performance

254/354, Noise/Vibration - Forward Or Reverse

Other Concerns: Noise/Vibration - Forward Or Reverse

Other Concerns: Noise/Vibration — Forward Or Reverse

Possible Component	Reference/Action
254 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
354 — HYDRAULIC/MECHANICAL ROUTINE	
For Noises/Vibrations That Change With Engine Speed	
• Converter components/balance weight • Fluid level (low) pump cavitation • Pump assembly • Engine drive accessories • Cooler lines grounding out • Flexplate	• Locate source of disturbance. Repair as required.
For Noises/Vibrations That Change With Vehicle Speed	
• Engine mounts loose or damaged	• Locate source of disturbance and repair as required.
• Driveline concerns:	— U-joints — Rear axle — Suspension — Modifications
• 1st Gear: — Low one-way clutch — Gearset — Friction elements	• Refer to the following shift routine(s) for further diagnosis: — Shift 1-2, Routine 320 — Shift 2-3, Routine 321 — Shift 3-4, Routine 322 — Shift 4-3, Routine 323 — Shift 3-2, Routine 324 — Shift 2-1, Routine 325 — Torque Converter Cycling 242/342
• 2nd Gear: — Intermediate one-way clutch — Intermediate clutch piston bleed hole out of 12 o'clock position — Friction elements	
• 3rd Gear: — Torque converter — Case to planet support spring — Friction elements	
• 4th Gear: — Gear set — Friction elements — Torque converter	
• Reverse: — Gear set — Friction elements	
• Output shaft splines worn or damaged	
Other Noises/Vibrations	
• Main controls, valve resonance	
• Selector lever cable: — Vibration — Grounding — Cooler lines — Grounding	• Locate source of disturbance and repair as required.

254/354 Other Concerns: Noise/Vibration - Forward Or Reverse

255/355, Engine Will Not Crank

Other Concerns: Engine Will Not Crank

Other Concerns: Engine Will Not Crank

Possible Component	Reference/Action
255 — ELECTRICAL ROUTINE	
Powertrain Control System • Electrical inputs/outputs, vehicle wiring harnesses, engine starting system hardware, digital TR sensor	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test C. Repair and adjust as required.
355 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.

255/355 Other Concerns: Engine Will Not Crank

256/356, No Park (P) Range

Other Concerns: No Park (P) Range

Other Concerns: No Park (P) Range

Possible Component	Reference/Action
256 — ELECTRICAL ROUTINE	
• No Electrical Concerns	
356 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission selector lever cable adjustment. Adjust transmission selector lever cable as necessary. After adjusting the transmission selector lever cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Park Mechanism • Output shaft ring, parking brake pawl, parking pawl return spring, park rod guide cup, parking pawl shaft, parking pawl actuating rod, manual lever detent spring damaged or assembled incorrectly	• Inspect for damage or incorrect assembly and repair as required.

256/356 Other Concerns: No Park (P) Range

257/357, Overheating

Other Concerns: Overheating

Other Concerns: Overheating

Possible Component	Reference/Action
257 — ELECTRICAL ROUTINE	
Refer to Routine 240/340, Torque Converter Operation Concern: No Apply	
357 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid • Incorrect level • Condition	 • Adjust fluid to correct level. • Inspect condition of fluid.

257/357 Other Concerns: Overheating (Part 1)

Other Concerns: Overheating (Continued)

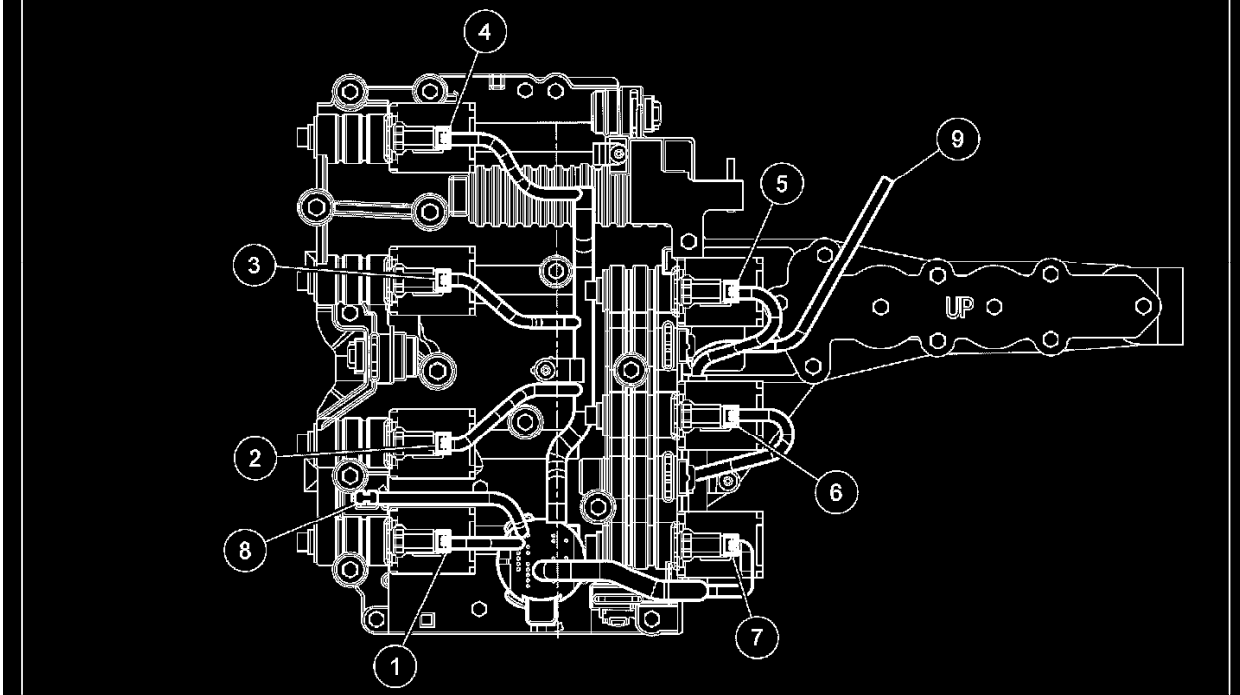
Possible Component	Reference/Action
Other • Damaged, blocked or reversed cooler lines or restriction in the transmission oil cooler	 • Inspect for damage and correct installation. Repair as required.
Vehicle Concerns Causing Engine Overheating	 • Refer to the appropriate engine cooling section.
Main Controls • Drain back valve, torque clutch control valve, converter limit valve stuck, damaged or assembled incorrectly	 • Inspect for damage and repair as required.
Torque Converter Clutch • No apply	 • Refer to Routine 240/340.

257/357 Other Concerns: Overheating (Part 2)

Transmission Connector Layouts

Transmission Connector Layouts

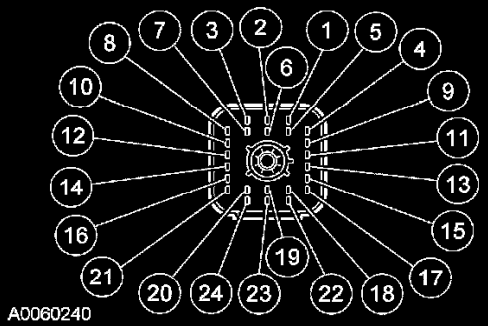
Internal Transmission Harness Connector/Component Locator



Item	Description
1	PC-A (line pressure control)
2	TCC (torque converter clutch)
3	SSPC-B (overdrive clutch)
4	SSPC-A (coast clutch)
5	SSPC-E (low/reverse clutch)
6	SSPC-D (direct clutch)
7	SSPC-C (intermediate clutch)
8	TFT (transmission fluid temperature)
9	TR position (transmission range sensor)

Internal Transmission Harness Connector/Component Locator

Transmission Vehicle Harness Connector



Pin Number	Descrip-tion	Diesel PCM Connector	Gas PCM Connector
1	SSPC-E	13	12
2	Not Used	—	—
3	SSPC-B	10	2

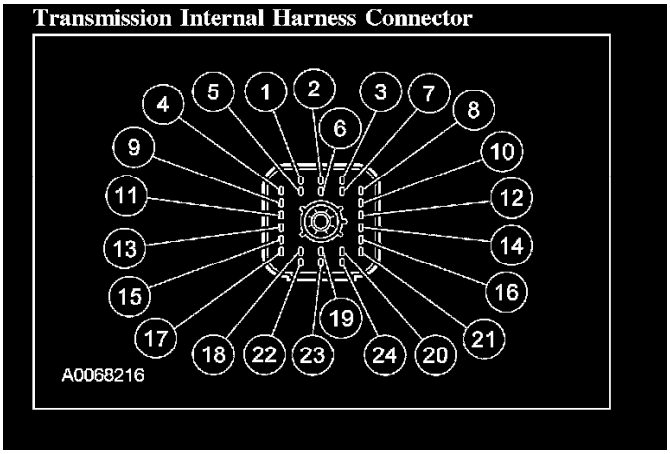
Transmission Vehicle Harness Connector (Part 1)

Pin Number	Descrip-tion	Diesel PCM Connector	Gas PCM Connector
4	SSPC-D	12	11
5	SSPC-C	11	10
6	Not Used	—	—
7	Solenoid VPWR	7	49
8	TCC	14	13
9	Not Used	—	—
10	PC-A	2	23
11	Not Used	—	—
12	SSPC-A	9	1
13	Not Used	—	—
14	Not Used	—	—
15	TR Position Signal	25	19
16	Not Used	—	—
17	TR Position Ground	22	50
18	TFT Signal	26	29
19	Not Used	—	—
20	Solenoid VPWR	7	49

Transmission Vehicle Harness Connector (Part 2)

Pin Number	Description	Diesel PCM Connector	Gas PCM Connector
21	VPWR for TR Position Sensor only	1	39
22	SGNRTN	30	41
23	Not Used	—	—
24	Solenoid VPWR	7	49

Transmission Vehicle Harness Connector (Part 3)



Transmission Internal Harness Connector (Part 1)

Pin Number	Description	Diesel PCM Connector	Gas PCM Connector	Int. Wire Color Pin No. 1	Int. Wire Color Pin No. 2	Int. Wire Color Pin No. 3
1	SSPC-E	13	12	Light Green	Gray	—
2	Not Used	—	—	—	—	—
3	SSPC-B	10	2	Red	Light green	—
4	SSPC-D	12	11	Brown	Pink	—
5	SSPC-C	11	10	Yellow	Purple	—
6	Not Used	—	—	—	—	—
7	Solenoid VPWR[a]	7	49	—	—	—
8	TCC	14	13	Dark Blue	Orange	—
9	Not Used	—	—	—	—	—
10	PC-A	2	23	Light Blue	White	—
11	Not Used	—	—	—	—	—
12	SSPC-A	9	1	Purple	Yellow	—
13	Not Used	—	—	—	—	—
14	Not Used	—	—	—	—	—

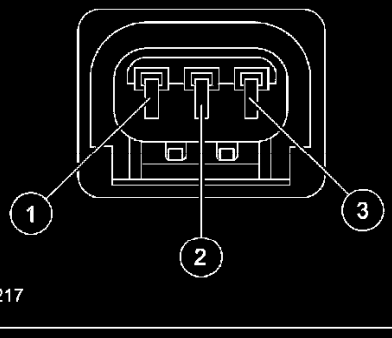
Transmission Internal Harness Connector (Part 2)

Pin Number	Description	Diesel PCM Connector	Gas PCM Connector	Int. Wire Color Pin No. 1	Int. Wire Color Pin No. 2	Int. Wire Color Pin No. 3
15	TR Position Signal	25	19	—	Light Blue	—
16	Not Used	—	—	—	—	—
17	TR Position Ground	22	50	—	—	Tan
18	TFT Signal	26	29	Tan	Gray	—
19	Not Used	—	—	—	—	—
20	Solenoid VPWR[a]	7	49	—	—	—
21	VPWR for TR Position Sensor only	1	39	Orange	—	—
22	SGNRTN[a]	30	41	—	—	—
23	Not Used	—	—	—	—	—
24	VPWR[a]	7	49	—	—	—

a See negative pins for SSPC-x.

Transmission Internal Harness Connector (Part 3)

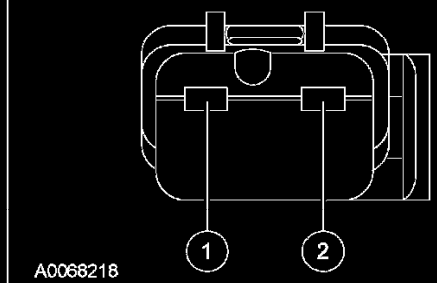
Internal Harness TR Position Sensor Connector — Tan (3 Pin)



Pin Number	Circuit Function
1	Power
2	Sensor Signal
3	Ground

Internal Harness TR Position Sensor Connector - Tan (3 Pin)

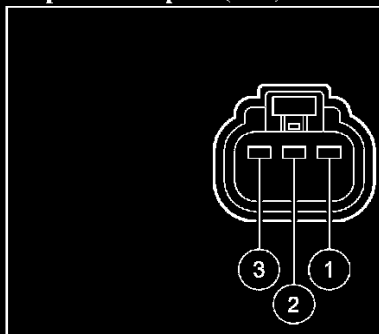
Internal Harness SSPC-x Solenoid Connector — Tan (2 Pin)



Pin Number	Circuit Function
1	Common
2	Solenoid Signal

Internal Harness SSPC-x Solenoid Connector - Tan (2 Pin)

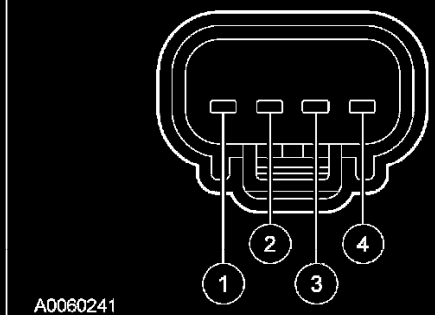
Output Shaft Speed (OSS) Sensor Harness Connector



Pin Number	Diesel PCM Pin	Gas PCM Pin	Circuit Function
1	1	39	Vehicle Power
2	28	3	Output Shaft Speed Sensor (OSS)
3	22	41	Signal Return

Output Shaft Speed (OSS) Sensor Harness Connector

Intermediate Shaft Speed and Turbine Shaft Speed (TSS) Sensor Harness Connector



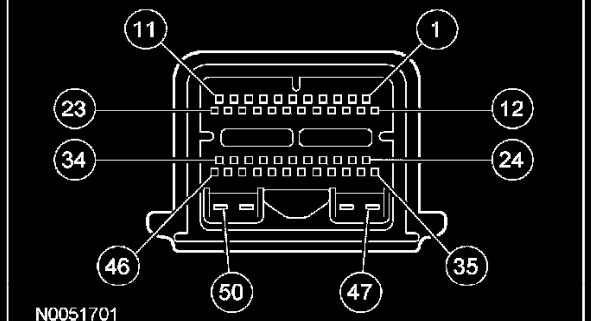
Pin Number	Diesel PCM Pin	Gas PCM Pin	Circuit Function
1	1	39	Vehicle Power
2	22	41	Signal Return

Intermediate Shaft Speed and Turbine Shaft Speed (TSS) Sensor Harness Connector (Part 1)

Pin Number	Diesel PCM Pin	Gas PCM Pin	Circuit Function
3	29	15	Turbine Shaft Speed (TSS) Sensor
4	27	4	Intermediate Shaft Speed Sensor

Intermediate Shaft Speed and Turbine Shaft Speed (TSS) Sensor Harness Connector (Part 2)

Transmission PCM Connector



Transmission Connector Pin Number	Description	Diesel PCM Connector Pin Number	Gas PCM Connector Pin Number
1	SSPC-E	13	12
2	Not Used	—	—
3	SSPC-B	10	2
4	SSPC-D	12	11
5	SSPC-C	11	10
6	Not Used	—	—
7	Solenoid VPWR	7	49
8	TCC	14	13
9	Not Used	—	—
10	PC-A	2	23
11	Not Used	—	—
12	SSPC-A	9	1
13	Not Used	—	—
14	Not Used	—	—
15	TR Position Signal	25	19
16	Not Used	—	—

Transmission PCM Connector (Part 1)

Transmission Connector Pin Number	Description	Diesel PCM Connector Pin Number	Gas PCM Connector Pin Number
17	TR Position Ground	22	50
18	TFT Signal	26	29
19	Not Used	—	—
20	Solenoid VPWR	7	49

Transmission Connector Pin Number	Description	Diesel PCM Connector Pin Number	Gas PCM Connector Pin Number
21	VPWR for TR Position Sensor only	1	39
22	SGNRTN	30	41
23	Not Used	—	—
24	Solenoid VPWR	7	49

Transmission PCM Connector (Part 2)

Diagnosis By Symptom

Diagnosis By Symptom

The Diagnosis By Symptom Index 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 to the symptom described.

Diagnosis By Symptom Index Directions

1. Use the Symptom Index to select the Concern/Symptom that best describes the condition.
2. Refer to the routine indicated in the Diagnosis By Symptom Index.
3. Always begin diagnosis of a symptom with:
   1 preliminary inspections.
   2 verification of conditions.
   3 checking fluid levels.
   4 carrying out other test procedures as directed.

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

   NOTE: When the battery is disconnected or a new battery is installed, certain transmission operating parameters can be lost. The powertrain control module (PCM) 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 PCM.

   Follow the reference or action statements. Always carry out the on-board diagnostic tests as necessary. Never skip steps. Repair as necessary. If the concern is still present after the electrical components have been diagnosed, proceed to the hydraulic/mechanical components 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 of correct repair.

Diagnosis by Symptom Index

Diagnosis by Symptom Index

Concerns and Symptoms	Routines
Engagement Concerns	
• No Forward ONLY	201
• No Reverse ONLY	202
• Harsh Reverse ONLY	203
• Harsh Forward ONLY	204
• Delayed/Soft Reverse ONLY	205
• Delayed/Soft Forward ONLY	206
• No Forward and No Reverse	207
• Harsh Forward and Harsh Reverse	208
• Delayed Forward and Delayed Reverse	209

Diagnosis by Symptom Index (Part 1)

Diagnosis by Symptom Index (Continued)

Concerns and Symptoms	Routines
Shift Concerns	
• Some/All Shifts Missing	210
• Timing Concern — Early/Late (Some/All)	211
• Timing Concern — Erratic/Hunting (Some/All)	212
• Feel Concern — Soft/Slipping (Some/All)	213
• Feel Concern — Harsh (Some/All)	214
• No 1st Gear in Drive, Engages in a Higher Gear	215
• No 1st Gear in Manual 1st	216
• No Manual 2nd Gear in Manual 2nd	217
• No Manual 3rd Gear in Manual 3rd	218
• Soft/Slipping 1-2 Shift	226
• Soft/Slipping 2-3 Shift	227
• Soft/Slipping 3-5 Shift	228
• Soft/Slipping 4-6 Shift	229
• Soft/Slipping 5-6 Shift	230
• Soft/Slipping 6-5 Shift	231
• Soft/Slipping 6-4 Shift	232
• Soft/Slipping 5-3 Shift	233
• Soft/Slipping 3-2 Shift	234
• Soft/Slipping 2-1 Shift	235
• Harsh 1-2 Shift	236
• Harsh 2-3 Shift	237
• Harsh 3-5 Shift	238
• Harsh 4-6 Shift	239
• Harsh 5-6 Shift	240
• Harsh 6-5 Shift	241
• Harsh 6-4 Shift	242
• Harsh 5-3 Shift	243
• Harsh 3-2 Shift	244
• Harsh 2-1 Shift	245
• Harsh 6-5 Coast Downshift with overdrive OFF	246
• Harsh 5-3 Coast Downshift with overdrive OFF or to Manual 3rd	247
• Harsh 3-2 Coast Downshift with overdrive OFF or to Manual 2nd	248
• Harsh 2-1 Coast Downshift with overdrive OFF or to Manual 1st	249
Torque Converter Clutch (TCC) Operation Concerns:	
• TCC Does Not Apply	250
• TCC Always Applied/Stalls Vehicle	251
• TCC Cycling, Shudder, Chatter	252
• Erratic TCC Scheduling	253

Diagnosis by Symptom Index (Part 2)

Diagnosis by Symptom Index (Continued)

Concerns and Symptoms	Routines
Other Concerns:	
• Shift Lever Efforts High	254
• External Leaks	255
• Vehicle Driveability Concerns	256
• Noise/Vibration — Forward or Reverse	257
• Engine Will Not Crank	258
• No Park Range	259
• Transmission Overheating	260
• Fluid Venting or Foaming	261
• Unexpected Elevated Idle Speed	262
• No (D) OFF (cancelled)	263
• Reverse Lamps Do Not Illuminate	264
• FMEM	265
• PTO Concerns	266
• Engagement Schedule Update — Dead battery — Battery disconnected — Calibration updated	267

Diagnosis by Symptom Index (Part 3)

201, No Forward Only

No Forward Only

No Forward Only

Possible Component	Reference/Action
201 — ROUTINE	
Powertrain Control System • PCM, external vehicle wiring harnesses, transmission internal harness, Line pressure control (PC-A) solenoid	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.
External Selector Lever Cable • Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure • Low pressure	• Check pressure at line tap. • Carry out Line Pressure Test. Follow the pressure diagnosis test as required.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged, blown out, leaking	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket.

201, No Forward Only (Part 1)

No Forward Only (Continued)

Possible Component	Reference/Action
• Contamination	• Disassemble and clean.
• PC-A solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new PC-A solenoid or solenoid body assembly. If misassembled, reassemble correctly.
OD OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new if damaged or fails inspection.
Center Support	
• Feed bolt not tightened to specification	• Tighten to specification.
• Forward clutch seal rings damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Low/Reverse OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new if damaged or fails inspection.

201, No Forward Only (Part 2)

202, No Reverse Only

No Reverse Only

No Reverse Only

Possible Component	Reference/Action
202 — ROUTINE	
Powertrain Control System	
• PCM, external vehicle wiring harnesses, transmission internal harness, line pressure control (PCA) solenoid	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and carry out on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure	
• Low pressure	• Check pressure at line tap. • Carry out Line Pressure Test. Follow the pressure diagnosis test as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged, blown out, leaking	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.

202, No Reverse Only (Part 1)

No Reverse Only (Continued)

Possible Component	Reference/Action
• PC-A solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new PC-A solenoid or solenoid body assembly. If misassembled, reassemble correctly.
Center Support	
• Feedbolt not tightened to specification	• Tighten to specification.
• Direct clutch seal rings or bearing damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return spring damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

202, No Reverse Only (Part 2)

203, Harsh Reverse Only

Harsh Reverse Only

Harsh Reverse Only

Possible Component	Reference/Action
203 — ROUTINE	
Powertrain Control System	
• PCM, external vehicle wiring harnesses, transmission internal harness, line pressure solenoid (PC-A), low/reverse solenoid SSPC-E	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • GO to Pinpoint Test A and GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure	
• High pressure	• Check pressure at line tap. • Carry out Line Pressure Test. Follow the pressure diagnosis test as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A, SSPC-E solenoid damaged, stuck or bore damaged. Manual valve or solenoid damaged, stuck or bore damaged	• If damaged or parts are missing, install a new PC-A solenoid or solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.

203, Harsh Reverse Only (Part 1)

Harsh Reverse Only (Continued)

Possible Component	Reference/Action
• Gasket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. Repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new pump.
• Control valves, springs or seal damaged, stuck or not assembled correctly	• Inspect for damage. Repair as necessary. If damaged, install a new seal or pump assembly.
Center Support	
• Feedbolt not tightened to specification	• Tighten to specification.
• Forward clutch seal rings or damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

203, Harsh Reverse Only (Part 2)

204, Harsh Forward Only

Harsh Forward Only

Harsh Forward Only

Possible Component	Reference/Action
204 — ROUTINE	
Powertrain Control System	
• PCM, external vehicle wiring harnesses, transmission internal harness	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure	
• High pressure	• Check pressure at line tap. • Carry out Line Pressure Test. Follow the pressure diagnosis test as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.

204, Harsh Forward Only (Part 1)

Harsh Forward Only (Continued)

Possible Component	Reference/Action
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoids damaged, stuck or bore damaged. Manual valve or solenoid damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. Repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new pump.
• Control valves, springs or seal damaged, stuck or not assembled correctly	• Inspect for damage. Repair as necessary. If damaged, install a new seal or pump assembly.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

204, Harsh Forward Only (Part 2)

205, Delayed Or Soft Reverse Only

Delayed or Soft Reverse Only

Delayed or Soft Reverse Only

Possible Component	Reference/Action
205 — ROUTINE	
Powertrain Control System • PCM, external vehicle wiring harnesses, transmission internal harness, line pressure (PC-A) low/reverse solenoid SSPC-E	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • GO to Pinpoint Test A and GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable • Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure • Low pressure	• Check pressure at line tap.

205, Delayed or Soft Reverse Only (Part 1)

Delayed or Soft Reverse Only (Continued)

Possible Component	Reference/Action
	• Carry out Line Pressure Test. Follow the pressure diagnosis test as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A, SSPC-E solenoid damaged, stuck or bore damaged. Manual valve or solenoid damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid or solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. Repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new pump.
• Control valves, springs or seal damaged, stuck or not assembled correctly	• Inspect for damage. Repair as necessary. If damaged, install a new seal or pump assembly.
Center Support	
• Feedbolt not tightened to specification	• Tighten to specification.
• Forward clutch seal rings or damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

205, Delayed or Soft Reverse Only (Part 2)

206, Delayed Or Soft Forward Only

Delayed or Soft Forward Only

Delayed or Soft Forward Only

Possible Component	Reference/Action
206 — ROUTINE	
Powertrain Control System	

206, Delayed or Soft Forward Only (Part 1)

Delayed or Soft Forward Only (Continued)

Possible Component	Reference/Action
• PCM, external vehicle wiring harnesses, transmission internal harness, line pressure solenoid (PC-A)	• Carry out self-test. Refer to Computer and Control Systems for diagnosis and testing of the Powertrain Control • GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A, solenoid damaged, stuck or bore damaged. Manual valve or solenoid damaged, stuck or bore damaged	• If damaged or parts are missing, install a new PCA-A solenoid or solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. Repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Repair as necessary. If damaged, install a new pump.
• Control valves, springs or seal damaged, stuck or not assembled correctly	• Inspect for damage. Repair as necessary. If damaged, install a new seal or pump assembly.
OD OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Low/Reverse OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.

206, Delayed or Soft Forward Only (Part 2)

Delayed or Soft Forward Only (Continued)

Possible Component	Reference/Action
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

206, Delayed or Soft Forward Only (Part 3)

207, No Forward and No Reverse

No Forward and No Reverse

No Forward and No Reverse

Possible Component	Reference/Action
207 — ROUTINE	
Powertrain Control System	
• PCM, external vehicle wiring harnesses, transmission internal harness, line pressure solenoid PC-A	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust to the correct level.
• Condition	• Carry out Fluid Condition Check.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressure	
• Low pressure	• Check pressure at line tap. • Carry out Line Pressure Test Follow the pressure diagnosis test as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged. Line pressure blowoff valve damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Input Shaft	
• Shaft damaged	• Inspect for damage. Repair as necessary.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.

207, No Forward and No Reverse (Part 1)

No Forward and No Reverse (Continued)

Possible Component	Reference/Action
• Pump gears and/or gear pocket damaged	• Inspect for damage. If damaged, install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly, skill orifice plugged, LPC air bleed plugged	• Inspect for damage. If damaged, install a new seal or pump assembly.
Center Shaft Assembly	
• Shaft damaged.	• Inspect for damage. Repair as necessary.
• Overdrive one-way clutch damaged	• Inspect for damage. Repair as necessary.
Center Support	
• Feedbolt not tightened to specification	• Tighten to specification.
• Forward clutch seal rings damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Output Shaft	
• Shaft damaged.	• Inspect for damage. Repair as necessary.
Torque Converter	
• Flexplate, adapter plate, turbine hub or impeller hub damaged	• Inspect for damage. Refer to Torque Converter Diagnosis. Repair as necessary.

207, No Forward and No Reverse (Part 2)

208, Harsh Forward and Harsh Reverse

Harsh Forward and Harsh Reverse

Harsh Forward and Harsh Reverse

Possible Component	Reference/Action
208 — ROUTINE	
Powertrain Control System **NOTE:** The battery being disconnected or a PCM reflash will cause firm engagements. PCM, external vehicle wiring harnesses, transmission internal harness, line pressure solenoid PC-A, torque converter clutch solenoid TCC, TSS/Intermediate shaft speed sensor, TFT and TR position sensors, IAT, ECT	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • If the battery has been disconnected or the PCM has been reflashed, carry out the engagement schedule update. • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	

208, Harsh Forward and Harsh Reverse (Part 1)

Harsh Forward and Harsh Reverse (Continued)

Possible Component	Reference/Action
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• High pressures	• Check line pressure at line tap. • Carry out Line Pressure Test. Follow pressure diagnosis and repair as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A, TCC solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged. Blowoff valve damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly, blowoff valve damaged	• Inspect for damage. Install a new seal or pump assembly.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

208, Harsh Forward and Harsh Reverse (Part 2)

209, Delayed Forward and Delayed Reverse

Delayed Forward and Delayed Reverse

Delayed Forward and Delayed Reverse

Possible Component	Reference/Action
209 — ROUTINE	
Powertrain Control System • PCM, external vehicle wiring harnesses, transmission internal harness, line pressure solenoid PC-A, IAT, ECT	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test E.

209, Delayed Forward and Delayed Reverse (Part 1)

Delayed Forward and Delayed Reverse (Continued)

Possible Component	Reference/Action
	• Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• Low pressures	• Check line pressure at line tap. • Check pressure at line tap. • Carry out Line Pressure Test Follow pressure diagnosis and repair as required.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

209, Delayed Forward and Delayed Reverse (Part 2)

210, Some/All Shifts Missing

Some/All Shifts Missing

Some/All Shifts Missing

Possible Component	Reference/Action
210 — ROUTINE	
Powertrain Control System	

210, Some/All Shifts Missing (Part 1)

Some/All Shifts Missing (Continued)

Possible Component	Reference/Action
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids SSPC-A, SSPC-B, SSPC-C, SSPC-D ,SSPC-E, Torque Converter Clutch (TCC) solenoid, line pressure control solenoids PC-A, TSS/Intermediate shaft speed sensor, Output Shaft Speed (OSS) sensor, Transmission Range (TR position) sensor, Transmission Fluid Temperature (TFT) sensor, Accelerator Pedal Position (APP) sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Some Shifts Missing Only	• If only some shifts are missing, determine which shift(s) do not occur. Use the Band, Clutch, Solenoid, Switch Application Chart and monitor the appropriate PIDs, refer to Special Testing Procedures
Fluid • Incorrect level • Condition	• Adjust fluid to correct level • Carry out Fluid Condition Check.
Incorrect Pressures • High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination • Solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean. • If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly • Bolts not tightened to specification • Gasket damaged • Porosity, cross leaks, cup plug missing, plugged hole • Pump gears and/or gear pocket damaged • Control valves, springs, or seals damaged, stuck or not assembled correctly	• Tighten to specification. • Inspect for damage. If damaged, install a new gasket. • Inspect for damage. If damaged, repair as necessary. • Inspect for damage. Install a new pump. • Inspect for damage. Install a new seal or pump assembly.
Coast Clutch Assembly • Seals, piston damaged	• Inspect for damage. Repair as necessary.

210, Some/All Shifts Missing (Part 2)

Some/All Shifts Missing (Continued)

Possible Component	Reference/Action
• Check ball damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
OD OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged.	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Cup plug missing, plugged or damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a center support assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Low/Reverse OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new transmission case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.

210, Some/All Shifts Missing (Part 3)

Some/All Shifts Missing (Continued)

Possible Component	Reference/Action
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Torque Converter • Internal failure	• Remove transmission. Inspect for damage. Carry out torque converter checks If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

210, Some/All Shifts Missing (Part 4)

211, Timing Concerns - Early/Late (Some/All)

Timing Concerns - Early/Late (Some/All)

Timing Concerns — Early/Late (Some/All)

Possible Component	Reference/Action
211— ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, Accelerator Pedal Position (APP) sensor, IAT sensor, ECT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Some Shifts Early/Late Only	• If only some shifts are early/late, determine which shift(s) is missing. • Refer to the following routine(s) for further Soft/Slipping Shift concerns: — Soft/Slipping 1-2 Shift, Routine 226 — Soft/Slipping 2-3 Shift, Routine 227 — Soft/Slipping 3-5 Shift, Routine 228 — Soft/Slipping 4-6 Shift, Routine 229 — Soft/Slipping 5-6 Shift, Routine 230 — Soft/Slipping 6-5 Shift, Routine 231 — Soft/Slipping 6-4 Shift, Routine 232 — Soft/Slipping 5-3 Shift, Routine 233 — Soft/Slipping 3-2 Shift, Routine 234 — Soft/Slipping 2-1 Shift, Routine 235
Fluid • Incorrect level	• Adjust to the correct level. • Carry out Fluid Condition Check.
Incorrect Pressures • High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean.

211, Timing Concerns - Early/Late (Some/All) (Part 1)

Timing Concerns — Early/Late (Some/All) (Continued)

Possible Component	Reference/Action
• Solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump assembly.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a center support assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new transmission case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

211, Timing Concerns - Early/Late (Some/All) (Part 2)

212, Timing Concerns - Erratic/Hunting (Some/All)

Timing Concerns - Erratic/Hunting (Some/All)

Timing Concerns — Erratic/Hunting (Some/All)

Possible Component	Reference/Action
212 — ROUTINE	
Powertrain Control System	

212, Timing Concerns - Erratic/Hunting (Some/All) (Part 1)

Timing Concerns — Erratic/Hunting (Some/All) (Continued)

Possible Component	Reference/Action
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids SSPC-A, SSPC-B, SSPC-C, SSPC-D, SSPC-E, line pressure control solenoids PC-A, TSS/Intermediate shaft speed sensor, Output Shaft Speed (OSS) sensor, Transmission Range (TR position) sensor, Transmission Fluid Temperature (TFT) sensor, tow/haul switch. Accelerator Pedal Position (APP) sensor, Brake Pedal Position (BPP) sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM, APP and BPP sensors.
• FMEM enabled, refer to routine 265	• GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid(s) damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Further Diagnosis	

212, Timing Concerns - Erratic/Hunting (Some/All) (Part 2)

Timing Concerns — Erratic/Hunting (Some/All) (Continued)

Possible Component	Reference/Action
• For further diagnosis for timing issues, refer to Reference/Actions	• Refer to the following routine(s) for specific diagnosis: — Soft/Slipping 1-2 Shift, Routine 226 — Soft/Slipping 2-3 Shift, Routine 227 — Soft/Slipping 3-5 Shift, Routine 228 — Soft/Slipping 4-6 Shift, Routine 229 — Soft/Slipping 5-6 Shift, Routine 230 — Soft/Slipping 6-5 Shift, Routine 231 — Soft/Slipping 6-4 Shift, Routine 232 — Soft/Slipping 5-3 Shift, Routine 233 — Soft/Slipping 3-2 Shift, Routine 234 — Soft/Slipping 2-1 Shift, Routine 235 — Harsh 1-2 Shift, Routine 236 — Harsh 2-3 Shift, Routine 237 — Harsh 3-5 Shift, Routine 238 — Harsh 4-6 Shift, Routine 239 — Harsh 5-6 Shift, Routine 240 — Harsh 6-5 Shift, Routine 241 — Harsh 6-4 Shift, Routine 242 — Harsh 5-3 Shift, Routine 243 — Harsh 3-2 Shift, Routine 244 — Harsh 2-1 Shift, Routine 245
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or pocket damaged	• Inspect for damage. Install a new pump assembly.
• Control valves, springs, or seal damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Check ball damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.

212, Timing Concerns - Erratic/Hunting (Some/All) (Part 3)

Timing Concerns — Erratic/Hunting (Some/All) (Continued)

Possible Component	Reference/Action
Forward Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a center support assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new transmission case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

212, Timing Concerns - Erratic/Hunting (Some/All) (Part 4)

213, Feel - Soft/Slipping (Some/All)

Feel - Soft/Slipping (Some/All)

Feel — Soft/Slipping (Some/All)

Possible Component	Reference/Action
213 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B, line pressure control solenoids PC-A, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Some Shifts Soft/Slipping Only	
	• If only some of the shifts are soft/slipping, determine which shift(s) is missing.

213, Feel - Soft/Slipping (Some/All) (Part 1)

Feel — Soft/Slipping (Some/All) (Continued)

Possible Component	Reference/Action
	• Refer to the following routine(s) for further Soft/Slipping concerns: — Soft/Slipping 1-2 Shift, Routine 226 — Soft/Slipping 2-3 Shift, Routine 227 — Soft/Slipping 3-5 Shift, Routine 228 — Soft/Slipping 4-6 Shift, Routine 229 — Soft/Slipping 5-6 Shift, Routine 230 — Soft/Slipping 6-5 Shift, Routine 231 — Soft/Slipping 6-4 Shift, Routine 232 — Soft/Slipping 5-3 Shift, Routine 233 — Soft/Slipping 3-2 Shift, Routine 234 — Soft/Slipping 2-1 Shift, Routine 235
Fluid	
• Incorrect level	• Adjust fluid to the correct level. Refer to Preliminary Inspection
• Condition	• Carry out Fluid Condition Check. Refer to Preliminary Inspection
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump assembly.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.

213, Feel - Soft/Slipping (Some/All) (Part 2)

214, Feel - Harsh (Some/All)

Feel - Harsh (Some/All)

Feel — Harsh (Some/All)

Possible Component	Reference/Action
214— ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids SSPC-B, TSS/Intermediate shaft speed sensor, Output Shaft Speed (OSS) sensor, Transmission Fluid Temperature (TFT) sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM.

214, Feel - Harsh (Some/All) (Part 1)

Feel — Harsh (Some/All) (Continued)

Possible Component	Reference/Action
	• GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Some Shifts Harsh Only	• If only some of the shifts are harsh, determine which shift(s) is missing. • Refer to the following routine(s) for further Harsh Shift concerns: — Harsh 1-2 Shift, Routine 236 — Harsh 2-3 Shift, Routine 237 — Harsh 3-5 Shift, Routine 238 — Harsh 4-6 Shift, Routine 239 — Harsh 5-6 Shift, Routine 240 — Harsh 6-5 Shift, Routine 241 — Harsh 6-4 Shift, Routine 242 — Harsh 5-3 Shift, Routine 243 — Harsh 3-2 Shift, Routine 244 — Harsh 2-1 Shift, Routine 245
Fluid • Incorrect level • Condition	• Adjust fluid to the correct level. • Carry out Fluid Condition Check.
Incorrect Pressures • High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination • Solenoid damaged, stuck or bore damaged, Manual valve damaged, stuck or bore damaged	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean. • If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly • Bolts not tightened to specification • Gasket damaged • Porosity, cross leaks, cup plug missing, plugged hole • Pump gears and/or gear pocket damaged • Control valves, springs, or seals damaged, stuck or not assembled correctly	• Tighten to specification. • Inspect for damage. If damaged, install a new gasket. • Inspect for damage. If damaged, repair as necessary. • Inspect for damage. Install a new pump. • Inspect for damage. Install a new seal or pump assembly.
Torque Converter	

214, Feel - Harsh (Some/All) (Part 2)

Feel — Harsh (Some/All) (Continued)

Possible Component	Reference/Action
• Internal failure	• Remove transmission. Inspect for damage. Carry out torque converter checks If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter. • Refer to Routine 251: TCC always applied/stalls vehicle.

214, Feel - Harsh (Some/All) (Part 3)

215, No 1st Gear In Drive, Engages In A Higher Gear

No 1st Gear in Drive, Engages in a Higher Gear

No 1st Gear in Drive, Engages in a Higher Gear

Possible Component	Reference/Action
215 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids SSPC-B, line pressure solenoid PC-A (shorted to ground), TCC solenoid (shorted to ground), TSS sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Incorrect Pressures • High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination • Solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean. • If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly • Seals, piston damaged • Friction elements damaged or worn • Return springs damaged	• Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary.
OD OWC • Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Direct Clutch Assembly • Seals, piston damaged • Friction elements damaged or worn • Return springs damaged	• Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary.

215, No 1st Gear in Drive, Engages in a Higher Gear (Part 1)

No 1st Gear in Drive, Engages in a Higher Gear (Continued)

Possible Component	Reference/Action
Low/Reverse OWC	
• Mechanical diode engaged in both directions, struts missing, OWC damaged	• Inspect for rotation in one direction only, mechanical diode should overrun in the opposite direction. Install a new OWC if damaged or fails inspection.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged.	• Inspect for damage. Repair as necessary.
Torque Converter	
• FMEM default mode applying the torque converter clutch	• Refer to FMEM routine 265.

215, No 1st Gear in Drive, Engages in a Higher Gear (Part 2)

216, No 1st Gear In Manual 1 Position

No 1st Gear in Manual 1 Position

No 1st Gear in Manual 1 Position

Possible Component	Reference/Action
216 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.

216, No 1st Gear in Manual 1 Position (Part 1)

No 1st Gear in Manual 1 Position (Continued)

Possible Component	Reference/Action
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive OWC Assembly	
• Worn, damaged or not assembled correctly	• Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

216, No 1st Gear in Manual 1 Position (Part 2)

217, No 2nd Gear In Manual 2 Position

No 2nd Gear in Manual 2 Position

No 2nd Gear in Manual 2 Position

Possible Component	Reference/Action
217 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Input Shaft	
• Shaft damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly (failed off)	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.

217, No 2nd Gear in Manual 2 Position (Part 1)

No 2nd Gear in Manual 2 Position (Continued)

Possible Component	Reference/Action
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

217, No 2nd Gear in Manual 2 Position (Part 2)

218, No 3rd Gear In Manual 3 Position

No 3rd Gear in Manual 3 Position

No 3rd Gear in Manual 3 Position

Possible Component	Reference/Action
218 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
External Selector Lever Cable	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Check ball damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum assembly.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new cylinder.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

218, No 3rd Gear in Manual 3 Position

226, Soft/Slipping 1-2 Shift

Soft/Slipping 1-2 Shift

Soft/Slipping 1-2 Shift

Possible Component	Reference/Action
226 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B (overdrive clutch control solenoid), TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSP-C solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

226, Soft/Slipping 1-2 Shift

227, Soft/Slipping 2-3 Shift

Soft/Slipping 2-3 Shift

Soft/Slipping 2-3 Shift

Possible Component	Reference/Action
227 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B, SSPC-C, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, SSPC-C solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.

227, Soft/Slipping 2-3 Shift (Part 1)

Soft/Slipping 2-3 Shift (Continued)

Possible Component	Reference/Action
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

227, Soft/Slipping 2-3 Shift (Part 2)

228, Soft/Slipping 3-5 Shift

Soft/Slipping 3-5 Shift

Soft/Slipping 3-5 Shift

Possible Component	Reference/Action
228 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-C, SSPC-D, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Center Support	
• Feedbolt not tightened to specification	• Tighten to specification.
• Forward clutch seal rings or damaged	• Inspect for damage. Repair as necessary.
• Support damaged or leaking	• Inspect for damage. Repair as necessary.

228, Soft/Slipping 3-5 Shift (Part 1)

Soft/Slipping 3-5 Shift (Continued)

Possible Component	Reference/Action
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new cylinder.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

228, Soft/Slipping 3-5 Shift (Part 2)

229, Soft/Slipping 4-6 Shift

Soft/Slipping 4-6 Shift

Soft/Slipping 4-6 Shift

Possible Component	Reference/Action
229 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, pressure control solenoids, SSPC-C, SSPC-D, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.

229, Soft/Slipping 4-6 Shift (Part 1)

Soft/Slipping 4-6 Shift (Continued)

Possible Component	Reference/Action
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

229, Soft/Slipping 4-6 Shift (Part 2)

230, Soft/Slipping 5-6 Shift

Soft/Slipping 5-6 Shift

Soft/Slipping 5-6 Shift

Possible Component	Reference/Action
230 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, pressure control solenoid SSPC-B	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap.

230, Soft/Slipping 5-6 Shift (Part 1)

Soft/Slipping 5-6 Shift (Continued)

Possible Component	Reference/Action
	• Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

230, Soft/Slipping 5-6 Shift (Part 2)

231, Soft/Slipping 6-5 Shift

Soft/Slipping 6-5 Shift

Soft/Slipping 6-5 Shift

Possible Component	Reference/Action
231 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-B, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap.

231, Soft/Slipping 6-5 Shift (Part 1)

Soft/Slipping 6-5 Shift (Continued)

Possible Component	Reference/Action
	• Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

231, Soft/Slipping 6-5 Shift (Part 2)

232, Soft/Slipping 6-4 Shift

Soft/Slipping 6-4 Shift

Soft/Slipping 6-4 Shift

Possible Component	Reference/Action
232 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-C, SSPC-D, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM.
	• GO to Pinpoint Test A and GO to Pinpoint Test D.
	• Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	

232, Soft/Slipping 6-4 Shift (Part 1)

Soft/Slipping 6-4 Shift (Continued)

Possible Component	Reference/Action
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, solenoid damaged, stuck or bore damaged, manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

232, Soft/Slipping 6-4 Shift (Part 2)

233, Soft/Slipping 5-3 Shift

Soft/Slipping 5-3 Shift

Soft/Slipping 5-3 Shift

Possible Component	Reference/Action
233 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoid, SSPC-C, SSPC-D, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

233, Soft/Slipping 5-3 Shift

234, Soft/Slipping 3-2 Shift

Soft/Slipping 3-2 Shift

Soft/Slipping 3-2 Shift

Possible Component	Reference/Action
234 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoid, SSPC-B, SSPC-C, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, SSPC-C, solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.

234, Soft/Slipping 3-2 Shift (Part 1)

Soft/Slipping 3-2 Shift (Continued)

Possible Component	Reference/Action
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

234, Soft/Slipping 3-2 Shift (Part 2)

235, Soft/Slipping 2-1 Shift

Soft/Slipping 2-1 Shift

Soft/Slipping 2-1 Shift

Possible Component	Reference/Action
235 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, pressure control solenoid SSPC-B, TSS/Intermediate shaft speed sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump assembly if damaged.

235, Soft/Slipping 2-1 Shift (Part 1)

Soft/Slipping 2-1 Shift (Continued)

Possible Component	Reference/Action
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

235, Soft/Slipping 2-1 Shift (Part 2)

236, Harsh 1-2 Shift

Harsh 1-2 Shift

Harsh 1-2 Shift

Possible Component	Reference/Action
236 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-B, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

236, Harsh 1-2 Shift

237, Harsh 2-3 Shift

Harsh 2-3 Shift

Harsh 2-3 Shift

Possible Component	Reference/Action
237 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-B, SSPC-C, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, SSPC-C, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new drum.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

237, Harsh 2-3 Shift

238, Harsh 3-5 Shift

Harsh 3-5 Shift

Harsh 3-5 Shift

Possible Component	Reference/Action
238 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-C, SSPC-D, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, TCC solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

238, Harsh 3-5 Shift

239, Harsh 4-6 Shift

Harsh 4-6 Shift

Harsh 4-6 Shift

Possible Component	Reference/Action
239 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, SSPC-C, SSPC-D, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

239, Harsh 4-6 Shift

240, Harsh 5-6 Shift

Harsh 5-6 Shift

Harsh 5-6 Shift

Possible Component	Reference/Action
240 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-B, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid • Incorrect level • Condition	• Adjust fluid to the correct level. • Carry out Fluid Condition Check.
Incorrect Pressures • High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination • SSPC-B, TCC solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean. • If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly • Seals, piston damaged • Filtered orifice damaged, missing, not seating, off location • Friction elements damaged or worn • Return springs damaged • Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary. • Inspect for mislocation, poor seating, damage. Install a new pump if damaged. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary.

240, Harsh 5-6 Shift

241, Harsh 6-5 Shift

Harsh 6-5 Shift

Harsh 6-5 Shift

Possible Component	Reference/Action
241 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-B, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM.

241, Harsh 6-5 Shift (Part 1)

Harsh 6-5 Shift (Continued)

Possible Component	Reference/Action
	• GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, TCC solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

241, Harsh 6-5 Shift (Part 2)

242, Harsh 6-4 Shift

Harsh 6-4 Shift

Harsh 6-4 Shift

Possible Component	Reference/Action
242 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoids, SSPC-C, SSPC-D, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	

242, Harsh 6-4 Shift (Part 1)

Harsh 6-4 Shift (Continued)

Possible Component	Reference/Action
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

242, Harsh 6-4 Shift (Part 2)

243, Harsh 5-3 Shift

Harsh 5-3 Shift

Harsh 5-3 Shift

Possible Component	Reference/Action
243 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoid SSPC-C, SSPC-D, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid • Incorrect level	• Adjust fluid to the correct level. Refer to Preliminary Inspection

243, Harsh 5-3 Shift (Part 1)

Harsh 5-3 Shift (Continued)

Possible Component	Reference/Action
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-C, SSPC-D TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

243, Harsh 5-3 Shift (Part 2)

244, Harsh 3-2 Shift

Harsh 3-2 Shift

Harsh 3-2 Shift

Possible Component	Reference/Action
244 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B, SSPC-C, TCC solenoid, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.

244, Harsh 3-2 Shift (Part 1)

Harsh 3-2 Shift (Continued)

Possible Component	Reference/Action
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, SSPC-D, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

244, Harsh 3-2 Shift (Part 2)

245, Harsh 2-1 Shift

Harsh 2-1 Shift

Harsh 2-1 Shift

Possible Component	Reference/Action
245 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B, TSS/Intermediate shaft speed sensor, OSS sensor, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.

245, Harsh 2-1 Shift (Part 1)

Harsh 2-1 Shift (Continued)

Possible Component	Reference/Action
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures • High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly • Bolts not tightened to specification • Filter gasket damaged • Contamination • SSPC-B solenoid damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• Tighten to specification. • Inspect for damage. If damaged, install a new filter gasket. • Disassemble and clean. • If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Overdrive Clutch Assembly • Seals, piston damaged • Filtered orifice damaged, missing, not seating, off location • Friction elements damaged or worn • Return springs damaged • Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary. • Inspect for mislocation, poor seating, damage. Install a new pump if damaged. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary. • Inspect for damage. Repair as necessary.

245, Harsh 2-1 Shift (Part 2)

246, Harsh 6-5 Coast Downshift With Overdrive OFF

Harsh 6-5 Coast Downshift with Overdrive OFF

Harsh 6-5 Coast Downshift with Overdrive OFF

Possible Component	Reference/Action
246 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-A, SSPC-B, TCC solenoid	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid • Incorrect level • Condition	• Adjust fluid to the correct level. • Carry out Fluid Condition Check.
Incorrect Pressures • High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	

246, Harsh 6-5 Coast Downshift with Overdrive OFF (Part 1)

Harsh 6-5 Coast Downshift with Overdrive OFF (Continued)

Possible Component	Reference/Action
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gaskct.
• Contamination	• Disassemble and clean.
• SSPC-A, SSPC-B, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

246, Harsh 6-5 Coast Downshift with Overdrive OFF (Part 2)

247, Harsh 5-3 Coast Downshift With Overdrive OFF Or To Manual 3rd

Harsh 5-3 Coast Downshift With Overdrive OFF Or To Manual 3rd

Harsh 5-3 Coast Downshift with Overdrive OFF or to Manual 3rd

Possible Component	Reference/Action
247 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-A, SSPC-C, SSPC-D, TCC solenoid(s), TSS/Intermediate shaft speed sensors, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.

247, Harsh 5-3 Coast Downshift With Overdrive OFF or to Manual 3rd (Part 1)

Harsh 5-3 Coast Downshift with Overdrive OFF or to Manual 3rd (Continued)

Possible Component	Reference/Action
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-A, SSPC-C, SSPC-D, TCC solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Direct Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Torque Converter	
• Internal failure	• Remove transmission. Inspect for damage. Carry out torque converter checks If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

247, Harsh 5-3 Coast Downshift With Overdrive OFF or to Manual 3rd (Part 2)

248, Harsh 3-2 Coast Downshift With Overdrive OFF Or To Manual 2nd

Harsh 3-2 Coast Downshift With Overdrive OFF Or To Manual 2nd

Harsh 3-2 Coast Downshift with Overdrive OFF or to Manual 2nd

Possible Component	Reference/Action
248 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-B, SSPC-C, SSPC-E, TCC solenoid, TSS/Intermediate shaft speed sensors, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.

248, Harsh 3-2 Coast Downshift With Overdrive OFF or to Manual 2nd (Part 1)

Harsh 3-2 Coast Downshift with Overdrive OFF or to Manual 2nd (Continued)

Possible Component	Reference/Action
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-B, SSPC-C, SSPC-E, TSS solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new center support if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

248, Harsh 3-2 Coast Downshift With Overdrive OFF or to Manual 2nd (Part 2)

Harsh 3-2 Coast Downshift with Overdrive OFF or to Manual 2nd (Continued)

Possible Component	Reference/Action
Torque Converter	
• Internal failure	• Remove transmission. Inspect for damage. Carry out torque converter checks. If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

248, Harsh 3-2 Coast Downshift With Overdrive OFF or to Manual 2nd (Part 3)

249, Harsh 2-1 Coast Downshift With Overdrive OFF Or To Manual 1st

Harsh 2-1 Coast Downshift With Overdrive OFF Or To Manual 1st

Harsh 2-1 Coast Downshift with Overdrive OFF or to Manual 1st

Possible Component	Reference/Action
249 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, shift pressure control solenoids, SSPC-A, SSPC-B, TCC solenoid, TSS/Intermediate shaft speed sensors, TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Incorrect Pressures	
• High pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-A, SSPC-B, TSS solenoid(s) damaged, stuck or bore damaged; manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Coast Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
Overdrive Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new pump if damaged.

249, Harsh 2-1 Coast Downshift With Overdrive OFF Or To Manual 1st (Part 1)

Harsh 2-1 Coast Downshift with Overdrive OFF or to Manual 1st (Continued)

Possible Component	Reference/Action
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Filtered orifice damaged, missing, not seating, off location	• Inspect for mislocation, poor seating, damage. Install a new case if damaged.
• Friction elements damaged or worn	• Inspect for damage. Repair as necessary.
• Return springs damaged	• Inspect for damage. Repair as necessary.
• Snap ring for OWC and/or return spring not seated or damaged	• Inspect for damage. Repair as necessary.

249, Harsh 2-1 Coast Downshift With Overdrive OFF Or To Manual 1st (Part 2)

250, TCC Does Not Apply

TCC Does Not Apply

TCC Does Not Apply

Possible Component	Reference/Action
250 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal wiring harness, transmission line pressure solenoid PC-A, TCC, TFT, transmission range (TR position) sensor, OSS	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C, GO to Pinpoint Test D and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Incorrect Pressures	
• Low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• SSPC-A, SSPC-B, TCC solenoid(s) damaged, misassembled, missing, stuck or bore damaged. Manual valve damaged, misassembled, missing, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.

250, TCC Does Not Apply (Part 1)

TCC Does Not Apply (Continued)

Possible Component	Reference/Action
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, converter charge limit valve, converter pressure regulator valve springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Torque Converter	
• Internal failure preventing TCC to apply	• Remove transmission. Inspect for damage. Carry out torque converter checks. If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

250, TCC Does Not Apply (Part 2)

251, TCC Always Apply/Stalls Vehicle

TCC Always Apply/Stalls Vehicle

TCC Always Apply/Stalls Vehicle

Possible Component	Reference/Action
251 — ROUTINE	
Powertrain Control System	
• Torque converter clutch (TCC) solenoid	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Incorrect Pressures	
• High TCC pressure	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• TCC solenoid damaged, misassembled, missing, stuck or bore damaged. Manual valve damaged, misassembled, missing, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, converter charge limit valve, converter pressure regulator valve springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.

251, TCC Always Apply/Stalls Vehicle (Part 1)

TCC Always Apply/Stalls Vehicle (Continued)

Possible Component	Reference/Action
Torque Converter	
• Internal failure preventing TCC to apply	• Remove transmission. Inspect for damage. Carry out torque converter checks If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

251, TCC Always Apply/Stalls Vehicle (Part 2)

252, TCC Cycling, Shudder, Chatter

TCC Cycling, Shudder, Chatter

TCC Cycling, Shudder, Chatter

Possible Component	Reference/Action
252 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal wiring harness, line pressure control solenoid PC-A, TCC, BPP, ECT sensors, tow haul switch.	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test E. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Incorrect Pressures	
• High/low TCC pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• PC-A, TCC solenoid(s) damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole	• Inspect for damage. If damaged, repair as necessary.
• Pump gears and/or gear pocket damaged	• Inspect for damage. Install a new pump.
• Control valves, converter charge limit valve, converter pressure regulator valve springs, or seals damaged, stuck or not assembled correctly	• Inspect for damage. Install a new seal or pump assembly.
Torque Converter	
• Internal components failure which prevents the torque converter clutch from releasing.	• Remove transmission. Inspect for damage. Carry out torque converter checks. If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

252, TCC Cycling, Shudder, Chatter

253, Erratic TCC Scheduling

Erratic TCC Scheduling

Erratic TCC Scheduling

Possible Component	Reference/Action
253 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal wiring harness, TCC solenoid, OSS sensor, transmission range (TR position) sensor, APP sensor, BPP sensor, ECT sensor, 4x4 switch, tow haul switch TFT sensor	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM.
	• GO to Pinpoint Test A and GO to Pinpoint Test B.
• FMEM enabled causing the TCC to engage, disengage then engage. DTC P0741 present	• Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• TCC solenoid damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Torque Converter	
• Internal component failure	• Remove transmission. Inspect for damage. Carry out torque converter checks If torque converter fails to pass checks or is damaged, install a new or remanufactured torque converter.

253, Erratic TCC Scheduling

254, Shift Lever Effort High

Shift Lever Effort High

Shift Lever Effort High

Possible Component	Reference/Action
254 — ROUTINE	
External Selector Lever Cable System	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
Transmission Range (TR position) Sensor Assembly	
• TR position sensor assembly damaged, manual valve inner lever pin bent or inner lever damaged	• Inspect and repair as necessary. Refer to Digital Transmission Range (TR) Sensor
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Contamination	• Disassemble and clean.
• Manual valve damaged, misassembled, stuck, or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Transmission Case	
• Manual control lever assembly damaged, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged	• Inspect parts for damage. Install new parts if damaged.

254, Shift Lever Effort High (Part 1)

Shift Lever Effort High (Continued)

Possible Component	Reference/Action
• Manual lever assembly pin incorrectly installed	• Inspect parts. If parts are found to be installed incorrectly, refer to Transmission
• Parking pawl incorrectly installed	• Inspect parts. If parts are found to be installed incorrectly, refer to Transmission

254, Shift Lever Effort High (Part 2)

255, External Leaks

External Leaks

External Leaks

Possible Component	Reference/Action
255 — ROUTINE	
Powertrain Control System	
• TSS/Intermediate shaft speed sensor, OSS sensor, transmission bulkhead connector	• Inspect for leakage. If areas around sensor or bulkhead connector show signs of leakage, install a new sensor O-ring seal.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Transmission External Remote Filter	
	• Inspect for leakage. If damaged, repair as necessary.
Incorrect Pressures	
• High/low pressures	• Check pressure at line tap. • Carry out Line Pressure Test.
Solenoid Body Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Filter gasket damaged	• Inspect for damage. If damaged, install a new filter gasket.
• Contamination	• Disassemble and clean.
• Solenoid(s) damaged, stuck or bore damaged. Manual valve stuck or bore damaged	• If damaged or parts are missing, install a new solenoid body assembly. If misassembled, reassemble correctly.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• O-ring damaged	• Inspect for damage. If damaged, install a O-ring.
• Porosity	• Inspect for damage. If damaged, repair as necessary.
Transmission Case Assembly	
• Case vent damaged, case porosity	• Inspect for damage. If damaged, repair as necessary
Seals/Gaskets	
• Leakage at gaskets, seals, etc.	• Refer to Leakage Inspection • Remove all traces of lubricant on exposed surface of the transmission. Repair as necessary.

255, External Leaks

256, Driveability Concerns

Driveability Concerns

Driveability Concerns

Possible Component	Reference/Action
256 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, transmission internal harness, transmission pressure control solenoids SSPC-x, TCC solenoid, transmission pressure control switches PS-x, OSS, TFT sensors, transmission control tow/haul switch, APP, IAT, ECT sensors	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A, GO to Pinpoint Test B and GO to Pinpoint Test D. • Repair as necessary. Clear DTCs, road test and rerun on-board diagnostic test.
Torque Converter	
• Torque internal components damaged	• Carry out torque converter check. If the torque converter fails the check, install a new or remanufactured torque converter.
• Incorrect torque converter used in overhaul	• Inspect for correct torque converter assembly. If not correct, install a new or remanufactured torque converter.

256, Driveability Concerns

257, Noise/Vibration Forward Or Reverse

Noise/Vibration Forward or Reverse

Noise/Vibration Forward or Reverse

Possible Component	Reference/Action
257 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses	• Carry out on-board diagnostic tests. Refer to the Computers and Control Systems for diagnosis and testing of the PCM. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
External Selector Lever Cable System	
• Cable system damaged, misaligned, grounding out	• Inspect and repair as necessary.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole gears cracked or seized	• Inspect for damage. If damaged, repair as necessary.
One-Way Clutches	
• Worn, damaged or assembled incorrectly	• Inspect for damage. Repair as necessary
Other	

257, Noise/Vibration Forward or Reverse (Part 1)

Noise/Vibration Forward or Reverse (Continued)

Possible Component	Reference/Action
• Transmission fluid cooling lines, fill tube grounding, driveshaft damaged	• Relocate cooling line or fill tube correctly. Inspect for damage. Repair as necessary.
Gears • Gear noise	• Inspect for damage. Repair as necessary.
Torque Converter Assembly • Flexplate, converter assembly damaged	• Inspect for damage. Carry out torque converter check. If the torque converter fails the check, install a new or remanufactured torque converter.

257, Noise/Vibration Forward or Reverse (Part 2)

258, Engine Will Not Crank

Engine Will Not Crank

Engine Will Not Crank

Possible Component	Reference/Action
258 — ROUTINE	
Powertrain Control System **NOTE:** If the battery has been disconnected or is dead, the transmission shifts and engagements will feel firm. Carry out Routine 267. PCM, vehicle wiring harnesses, vehicle starter transmission internal harness, transmission range (TR position) sensor, PATS module	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test C. Check PIDs for TR position, PARK and NEUTRAL. • Repair as required. Clear DTCs, road test and carry out on-board diagnostic test again.
Engine Components • Sensors, solenoids, fan clutch damaged or shorted to ground	• Inspect and repair as necessary. REFER to Computers and Control Systems
Vehicle Starter • Starter damaged	• Inspect and repair as necessary. Refer to Starting System.
External Selector Lever Cable System • Cable system damaged, misaligned	• Inspect and repair as necessary.
TR position Sensor Assembly • TR position assembly damaged	• Inspect and repair as necessary.
Fluid Pump Assembly • Internal parts seized	• Inspect for damage and repair as necessary.
Torque Converter • Flex plate damaged	• Inspect for damage and repair as necessary.

258, Engine Will Not Crank

259, No Park Range

No Park Range

No Park Range

Possible Component	Reference/Action
259 — ROUTINE	
Selector Lever Cable System	
• Cable system damaged, misaligned	• Inspect and repair as necessary.
TR position Assembly	
• TR position assembly damaged	• Inspect and repair as necessary.
Transmission Case	
• Manual control lever assembly damaged, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged	• Inspect for damage. If damaged, install new components.
• Manual valve lever shaft retaining pin damaged	• Inspect for damage. If damaged, repair as necessary.
Park System	
• Park gear, parking pawl, parking pawl return spring, park or guide plate, parking actuating rod, parking pawl shaft, manual lever, manual lever detent spring damaged or misassembled	• Inspect for damage. Repair as necessary.
• External linkages/brackets damaged	• Inspect for damage. Repair as necessary.

259, No Park Range

260, Transmission Overheating

Transmission Overheating

Transmission Overheating

Possible Component	Reference/Action
260 — ROUTINE	
Powertrain Control System	
NOTE: FMEM may be enabled, refer to routine 266. PCM, vehicle wiring harnesses, line pressure control solenoid PC-A, TCC solenoid	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test A and GO to Pinpoint Test E. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.
Fluid	
• Incorrect level	• Adjust fluid to correct level.
• Condition	• Carry out Fluid Condition Check.
Transmission External Remote Filter	
	• Inspect for leakage. If damaged, repair as necessary.
Fluid Pump Assembly	
• Bolts not tightened to specification	• Tighten to specification.
• Gasket damaged	• Inspect for damage. If damaged, install a new gasket.
• Porosity, cross leaks, cup plug missing, plugged hole gears cracked or seized	• Inspect for damage. If damaged, repair as necessary.
• Control valves and springs or seal damaged, misassembled or stuck	• If damaged or parts are missing, install a new seal or pump assembly. If misassembled, reassemble correctly.

260, Transmission Overheating (Part 1)

Transmission Overheating (Continued)

Possible Component	Reference/Action
Transmission Case	
• Case vent damaged	• Inspect for damage. If damaged, repair as necessary
Torque Converter	
• Torque converter one-way clutch seized	• Carry out torque converter check. If the torque converter fails the check, install a new or remanufactured torque converter.
• Excessive torque converter slip detected	• Carry out torque converter check. If the torque converter fails the check, install a new or remanufactured torque converter.
Other	
• Restriction in transmission cooling system	• Check transmission cooling system efficiency.
• Excessive trailer tow load	• Refer to the towing manual.
• Engine driveability concerns	• Check engine driveability concerns. Refer to Computers.
• Vehicle heat shields missing or damaged	• Inspect for damage. If damaged, repair as necessary.
• Vehicle air flow restricted	• Inspect for damage. If damaged, repair as necessary.

260, Transmission Overheating (Part 2)

261, Fluid Venting Or Foaming

Fluid Venting Or Foaming

Fluid Venting or Foaming

Possible Component	Reference/Action
261 — ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to the correct level.
• Condition	• Carry out Fluid Condition Check.
Transmission Case Assembly	
• Case Vent damaged	• Inspect for damage. Repair as necessary.
Other	
• Transmission overheating	• Refer to Routine 260.

261, Fluid Venting Or Foaming

262, Unexpected Elevated Idle Speed

Unexpected Elevated Idle Speed

Unexpected Elevated Idle Speed

Possible Component	Reference/Action
262 — ROUTINE	
Powertrain Control System	
• PCM, vehicle wiring harnesses, internal transmission wiring harness, line pressure control solenoid SSPC-A, TCC solenoid, low reverse pressure control switches PC-E, OSS, TFT, TR position sensors, TSPC driver circuit	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM.

262, Unexpected Elevated Idle Speed (Part 1)

Unexpected Elevated Idle Speed (Continued)

Possible Component	Reference/Action
• FMEM has been enabled	• GO to Pinpoint Test A, GO to Pinpoint Test B, GO to Pinpoint Test C and GO to Pinpoint Test D. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.

262, Unexpected Elevated Idle Speed (Part 2)

263, No Overdrive OFF (Cancelled)

No Overdrive OFF (Cancelled)

No Overdrive OFF (cancelled)

Possible Component	Reference/Action
263 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, internal transmission wiring harness, transmission control switch, transmission control indicator lamp (TCIL)	• Carry out on-board diagnostic tests. Refer to the Computers and Control Systems for diagnosis and testing of the PCM. • Refer to Transmission Control Systems. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.

263, No Overdrive OFF (Cancelled)

264, Reverse Lamps Do Not Illuminate

Reverse Lamps Do Not Illuminate

Reverse Lamps Do Not Illuminate

Possible Component	Reference/Action
264 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, internal transmission wiring harness, TR position sensor, reverse lamps	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test C. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.

264, Reverse Lamps Do Not Illuminate

265, Transmission Failure Mode Effects Management (FMEM), Shift Concerns: Erratic/Hunting Or Erratic Scheduling

Transmission Failure Mode Effects Management (FMEM), Shift Concerns: Erratic/Hunting or Erratic Scheduling

Transmission Failure Mode Effects Management (FMEM), Shift Concerns: Erratic/Hunting or Erratic Scheduling

Possible Component	Reference/Action
265 — ROUTINE	
Powertrain Control System • PCM, vehicle wiring harnesses, transmission internal harness, TSS/Intermediate shaft speed sensor, OSS sensor, TR position sensor, TFT sensor, TCIL, TCS switch, TSPC driver circuit	• Carry out on-board diagnostic tests. Refer to Computers and Control Systems for diagnosis and testing of the PCM. • GO to Pinpoint Test B, GO to Pinpoint Test C and GO to Pinpoint Test D. • Repair as required. Clear DTCs, road test and rerun on-board diagnostic test.

265, Transmission Failure Mode Effects Management (FMEM), 265, Shift Concerns: Erratic/Hunting or Erratic Scheduling (Part 1)

Transmission Failure Mode Effects Management (FMEM), Shift Concerns: Erratic/Hunting or Erratic Scheduling (Continued)

Possible Component	Reference/Action
	• Refer to Routine 212.
• The transmission FMEM serves three purposes: a. prevent invalid combinations of applied clutches that cause tie-ups b. isolate a potential fault down to a specific pressure switch, solenoid, or clutch c. after the fault had been isolated, limit gears of operation based on the failure	• When failures occur, the customer may complain of erratic shifting or transmission hanging in gear. This is normal for the FMEM strategy — determining which gears are being commanded, and which gears are being avoided will point to a specific pressure switch, solenoid, or clutch fault.

265, Transmission Failure Mode Effects Management (FMEM), 265, Shift Concerns: Erratic/Hunting or Erratic Scheduling (Part 2)

267, Engagement Schedule Update (Dead Battery, Disconnected Battery, Calibration Updated)

Engagement Schedule Update (Dead Battery, Disconnected Battery, Calibration Updated)

Engagement Schedule Update (dead battery, disconnected battery, calibration updated)

Possible Component	Reference/Action
267— ROUTINE	
Battery • Any time the vehicle battery has been disconnected, a new PCM has been installed or the vehicle calibration has been reflashed the adaptive strategy for the ''Engagement Schedule'' will need to be updated. This will prevent the customer from returning with firm engagements	**NOTE:** All of the following engagements must be carried out in order for engagement pressures to correctly adapt with the new calibration. Once the vehicles battery has been reconnected or the reprogramming is complete, the adaptive strategy for pressure control on engagements must be updated. a. Install the diagnostic equipment and monitor TFT. b. Warm the transmission fluid to 54°C (130°F) as indicated by the TFT. c. Carry out 5 engagements from PARK to REVERSE. Each engagement must be 5 seconds apart. d. Carry out 5 engagements from DRIVE to REVERSE. Each engagement must be 5 seconds apart. e. Carry out 5 engagements from REVERSE to DRIVE. Each engagement must be 5 seconds apart. f. Carry out 5 engagements from NEUTRAL to DRIVE. Each engagement must be 5 seconds apart.

267, Engagement Schedule Update (Dead Battery, Disconnected Battery, Calibration Updated)