Transmission Control Systems: Testing and Inspection
Diagnosis By Symptom

Index Directions

Diagnosis by Symptom Chart Directions

1. Using the Diagnosis by Symptom Index, select the Concern/Symptom that best describes the condition. See: Symptom Index (Diagnosis By Symptom Index)
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 ensure correct repair.

Symptom Index (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
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

Title	Routines	
	Electrical [a]	Hydraulic/ Mechanical
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 (P) Range	256	356
Overheating	257	357

a Carry out electrical routine first.

Part 2 Of 2

201/301: 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; refer to Verification of Condition.
Shift Linkage • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify the digital transmission range (TR) sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures • Low forward clutch pressure, low line pressure	• Check pressure at line and forward clutch tap. Refer to Line Pressure Chart for specification. 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 • Filter seal damaged	• Install a new filter and seal assembly.
Main Controls	

Part 1 Of 2

Possible Component	Reference/Action
• 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.

Part 2 Of 2

202/302: 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.
• Condition	• Inspect condition of fluid.
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	

Part 1 Of 2

Possible Component	Reference/Action
• Low reverse clutch pressure, low reverse band pressure, low line pressure	• Check pressure at line pressure tap; refer to Line Pressure Chart for specifications. 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	• Inspect for damage. Repair as required.
• Loose bolts	• Tighten bolts to specifications.
• Gasket damaged	• 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 damaged	
• Anchor pins (case) damaged	
Pump Assembly	
• Loose bolts	• Tighten bolts to specifications.
• Porosity/cross leaks/ball missing or leaking, plugged hole	• Inspect pump assembly. Install new as required.
• Gasket damaged	• Inspect for damage and install a new gasket.
• No. 1 and 2 seal rings damaged	• Inspect for damage. Repair as required.
Reverse Clutch Assembly	
• Seals, piston damaged	• Inspect for damage. Repair as required.
• Check ball missing or damaged	
• Friction elements damaged or worn	
Low/Reverse Band	
• Band, servo, anchor pins damaged or worn	• Inspect for damage. Repair as required.

Part 2 Of 2

203/303: 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 the Powertrain Management 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 Self-Test.
303 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
• Incorrect level	• Adjust fluid to correct level.

Part 1 Of 2

Possible Component	Reference/Action
• Condition	• 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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; refer to Line Pressure Chart for specifications. 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	• Inspect for damage. Repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Gasket damaged	• Inspect for damage and install a new gasket.
• EPC solenoid stuck or damaged	• 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	
• 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.

Part 2 Of 2

204/304: 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 the Powertrain Management 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	• Adjust fluid to correct level.
• Condition	• 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. Refer to Line Pressure Chart for specifications. If pressures are high, check the following possible components: main controls, pump assembly.
Main Controls	
• Main regulator valve stuck, damaged	• Inspect and repair as required.
• Bolts not tightened to specifications	• Tighten bolts to specifications.
• Gaskets damaged	• Inspect for damage and install a new gasket.
• EPC solenoid stuck or damaged	• Inspect for damage or contamination. Carry out EPC test in Routine 204. Repair as required.
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.

205/305: 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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; refer to Line Pressure Chart for specifications. If pressures are low, check the following components: main controls, pump assembly, reverse clutch assembly, reverse servo.
Fluid Filter and Seal Assembly	
• Plugged, damaged	• Install a new filter and seal assembly.
	• Filter seal damaged
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.
• 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	

Part 1 Of 2

Possible Component	Reference/Action
Low Reverse Band	
• Damaged, worn	• Inspect for damage. Repair as required.

Part 2 Of 2

206/306: 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	
• Low forward clutch pressure, low line pressure, low EPC pressure	• Check pressure at line, forward clutch and EPC taps; refer to Line Pressure Chart for specifications. 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.

Part 1 Of 2

Possible Component	Reference/Action
• 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.

Part 2 Of 2

210/310: 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 the Powertrain Management 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 Self-Test.
310 — HYDRAULIC/MECHANICAL ROUTINE	
Fluid • Incorrect level • Condition	 • Adjust fluid to correct level. • Inspect condition of fluid.
Shift Linkage, Digital TR Sensor • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary. • 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

211/311: 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 the Powertrain Management 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 Self-Test.
311 — HYDRAULIC/MECHANICAL ROUTINE	
Other	

Possible Component	Reference/Action
• 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	• Adjust fluid to correct level.
• Condition	• Inspect condition of fluid.
Powertrain Control System	
• Engine driveability concerns	• Refer to Routine 253.
Incorrect Pressures	
• Line pressure, EPC pressure	• Check pressure at line and EPC taps; refer to Line Pressure Chart for specifications. 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.

Part 2 Of 2

212/312: 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 the Powertrain Management 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.

Part 1 Of 2

Possible Component	Reference/Action
• 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.
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

Part 2 Of 2

213/313: 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 the Powertrain Management 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; refer to Line Pressure Chart for specifications. 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.

Part 1 Of 2

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

Part 2 Of 2

214/314: 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 the Powertrain Management 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. See the to Line Pressure Chart for specifications. 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.

215/315: 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 • Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, digital transmission range TR sensor	• Carry out Self-Test. Refer to the Powertrain Management 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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 • 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/Clutch Application Chart 601 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 Assembly.

X = pressure applied

216/316: 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 the Powertrain Management 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	

Possible Component	Reference/Action
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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; refer to Line Pressure Chart for specifications. 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	• 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.
Low Reverse Servo	
• Seals (piston and cover) damaged	• Inspect for damage. Repair as required. • Servo cover retaining ring assembled incorrectly. • Anchor pins (case) damaged.

Part 2 Of 2

217/317: 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 the Powertrain Management 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	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Main Controls	

Part 1 Of 2

Possible Component	Reference/Action
• 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.

Part 2 Of 2

220/320: 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 the Powertrain Management 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 performance	• Refer to Routine 253.
320 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	
• Intermediate clutch pressure, line pressure	• Check pressure at line and intermediate clutch taps; see the line pressure chart for specifications. 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.
• 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	

Part 1 Of 2

Possible Component	Reference/Action
• 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.

Part 2 Of 2

221/321: 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 the Powertrain Management 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.
321 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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 Line 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.

Part 1 Of 2

Possible Component	Reference/Action
• 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	• Inspect for damage. Repair as required.
• Cup plug damaged or missing	
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.

Part 2 Of 2

222/322: 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 switch (TCS)	• Carry out Self-Test. Refer to the Powertrain Management 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.

Part 1 Of 2

Possible Component	Reference/Action
Incorrect Pressures	
• Forward clutch pressure, direct clutch pressure, line pressure	• Check line, direct and forward clutch pressures at appropriate taps; refer to Line Pressure Chart for specifications. 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	
• 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.

Part 2 Of 2

223/323: 4-3 Shift (Automatic)

Shift Concerns: 4-3 Shift (Automatic)

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

Part 1 Of 2

Possible Component	Reference/Action
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, transmission control switch (TCS)	• Carry out Self-Test. Refer to the Powertrain Management 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; refer to Line Pressure Chart for specifications. 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.
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.

Part 2 Of 2

224/324: 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 the Powertrain Management 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; refer to Line Pressure Chart for specifications. 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.

225/325: 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 the Powertrain Management 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 Line Pressure Chart for specifications. If not within specifications, check main controls and pump.

Possible Component	Reference/Action
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.
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.

Part 2 Of 2

240/340: No Apply

Torque Converter Clutch Operation Concerns: No Apply

Possible Component	Reference/Action
240 — ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, PCM, torque converter clutch (TCC) solenoid, TFT sensor, OSS	• Carry out Self-Test. Refer to the Powertrain Management 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Incorrect Pressures	

Part 1 Of 2

Possible Component	Reference/Action
• Low line pressure, low EPC pressure	• Check pressure at line and EPC taps; refer to Line Pressure Chart for specifications. 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.

Part 2 Of 2

241/341: 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 Powertrain Management 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.

Part 1 Of 2

Possible Component	Reference/Action
• 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.

Part 2 Of 2

242/342: 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 the Powertrain Management 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	
• 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 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.

Part 1 Of 2

Possible Component	Reference/Action
• 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 re-manufactured torque converter as required.

Part 2 Of 2

250/350: No Engine Braking In 2nd, Manual 2nd or 1st Positions

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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.
Main Controls	
• 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.

251/351: 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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 the appropriate brake section in the workshop manual.
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.

252/352: 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	
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.

253/353: 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 the Powertrain Management 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. Inspect the exhaust system for restriction.
353 — HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage, Digital TR Sensor	
• Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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 converter as outlined.

254/354: 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	

Possible Component	Reference/Action
• Engine mounts loose or damaged • Driveline concerns: — U-joints — Rear axle — Suspension — Modifications 1st Gear: — Low one-way clutch — Gearset — Friction elements • 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	• Locate source of disturbance and repair as required. • 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
Other Noises/Vibrations • Main controls, valve resonance • Shift cable: — Vibration — Grounding — Cooler lines — Grounding	• Locate source of disturbance and repair as required.

Part 2 Of 2

255/355: 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 the Powertrain Management for diagnosis and testing of the Powertrain Control System. GO to Pinpoint Test C. Repair and adjust as required.
355 — HYDRAULIC/MECHANICAL ROUTINE	

Part 1 Of 2

Possible Component	Reference/Action
Shift Linkage, Digital TR Sensor • Damaged or incorrectly adjusted	• Inspect and repair as required. Verify transmission shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift cable, verify that the digital TR sensor is correctly adjusted. Adjust the digital TR sensor as necessary.

Part 2 Of 2

256/356: 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 shift cable adjustment. Adjust transmission shift cable as necessary. After repairing transmission shift 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.

257/357: 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.
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 Cooling System.
Main Controls • Drain back valve, torque clutch control valve, converter limit valve stuck, damaged or assembled incorrectly	• Inspect for damage and repair as required.

Part 1 Of 2

Possible Component	Reference/Action
Torque Converter Clutch • No apply	• Refer to Routine 240/340.

Part 2 Of 2