

Electric Vehicle (EV) Diagnostic Direction

NO FORWARD ENGAGEMENT

| Possible Component | Reference/Action |
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| 201 — ELECTRICAL ROUTINE | |
| · No Electrical Concerns | |
| 301 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| · Improper level | · Adjust fluid to proper level. |
| · Condition | · Inspect as described under Fluid Condition Check. |
| Shift Linkage | |
| · Damaged, out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify Digital TR sensor is properly adjusted. Refer to the Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| · Low forward clutch pressure, low line pressure | · Check pressure at line and forward clutch tap. Refer to Reference: Pressure Chart #401 for specification. If pressures are low, check the following possible components: <ul style="list-style-type: none"> ▪ fluid filter and seal assembly, ▪ main controls, pump assembly, ▪ forward clutch assembly. |
| Fluid Filter and Seal Assembly | |
| · Plugged, damaged | · Replace fluid filter and seal assembly. |
| · Filter seal damaged | |
| Main Controls | |
| · 3-4 shift valve, main regulator valve, manual valve stuck, damaged | · Inspect for damage. Service as required. |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Gaskets damaged | · Inspect gasket for damage and replace. |
| · 2-3 accumulator and seals damaged | · Inspect piston, seals and bore for damage. Service as required. |
| Pump Assembly | |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Porosity/cross leaks and ball missing or leaking, plugged hole | · Inspect for porosity and leaks. Service as required. |
| · No. 3 and No. 4 seal rings damaged | · Inspect seals for damage. Service as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Forward Clutch Assembly | |
| · Seals, piston damaged | · Inspect seals for damage. Service as required. |
| · Check balls damaged, missing, mislocated, not seating properly | · Inspect for mislocation, poor seating, damage. Replace cylinder as required. |
| · Friction elements damaged or worn | · Check for abnormal wear, damage. Service as required. |
| Low One-Way Clutch Assembly (Planetary) | |
| · Worn, damaged or misassembled | · Inspect for damage. Service as required. |

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| Output Shaft | |
| · Damaged | · Inspect for damage. Service as required. |

NO REVERSE ENGAGEMENT CONCERN

| Possible Component | Reference/Action |
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| 202 — ELECTRICAL ROUTINE | |
| · No Electrical Concerns | |
| 302 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| · Improper level | · Adjust fluid to proper level. |
| · Condition | · Inspect as described under Fluid Condition Check. |
| Shift Linkage | |
| · Damaged or out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| · Low reverse clutch pressure, low reverse band pressure, low line pressure | · Check pressure at line pressure tap. Refer to Reference: Pressure Chart #401 for specifications. If pressures are low, check the following possible components: <ul style="list-style-type: none"> ▪ fluid filter and seal assembly, ▪ main controls, ▪ reverse servo, ▪ pump assembly, ▪ reverse clutch assembly. |
| Fluid Filter and Seal Assembly | |
| · Plugged, damaged | · Replace 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. Service as required. |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Gasket damaged | · Inspect for damage and replace. |
| Low Reverse Servo | |
| · Seals (piston and cover) damaged | · Inspect for damage. Service as required. |
| · Servo cover retaining ring damaged | |
| · Anchor pins (case) damaged | |
| Pump Assembly | |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Porosity/cross leaks/ball missing or leaking, plugged hole | · Inspect pump assembly. Replace as required. |
| · Gasket damaged | · Inspect for damage and replace. |
| · No. 1 and 2 seal rings damaged | · Inspect for damage. Service as required. |
| Reverse Clutch Assembly | |
| · Seals, piston damaged | · Inspect for damage. Service 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. Service as required.

ENGAGEMENT CONCERN: HARSH REVERSE

| Possible Component | Reference/Action |
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| 203 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| <ul style="list-style-type: none"> · Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, EI system, EPC solenoid, TFT sensor | <ul style="list-style-type: none"> · Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform engagement test, EPC test and Pinpoint Tests B and E using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 303 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| <ul style="list-style-type: none"> · Improper level | <ul style="list-style-type: none"> · Adjust fluid to proper level. |
| <ul style="list-style-type: none"> · Condition | <ul style="list-style-type: none"> · Inspect as described under Fluid Condition Check. |
| Shift Linkage | |
| <ul style="list-style-type: none"> · Damaged or out of adjustment | <ul style="list-style-type: none"> · Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| <ul style="list-style-type: none"> · High line pressure, high EPC pressure | <ul style="list-style-type: none"> · Check pressure at line and EPC pressure taps. Refer to Reference: Pressure Chart #401 for specifications. If high, check the following possible components: main controls, oil filter and seal assembly. |
| Oil Filter and Seal Assembly | |
| <ul style="list-style-type: none"> · Plugged or damaged | <ul style="list-style-type: none"> · Replace filter and seal assembly. |
| <ul style="list-style-type: none"> · Filter seal damaged | |
| Main Controls | |
| <ul style="list-style-type: none"> · No. 6 Shuttle ball, No. 5 check ball, manual valve, main regulator valve stuck, damaged or missing | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> · Loose bolts | <ul style="list-style-type: none"> · Tighten bolts to specification. |
| <ul style="list-style-type: none"> · Gasket damaged | <ul style="list-style-type: none"> · Inspect for damage and replace. |
| <ul style="list-style-type: none"> · EPC solenoid stuck or damaged | <ul style="list-style-type: none"> · Inspect for damage, contamination. Perform EPC test in Routine No. 203. Service as required. |
| Low Reverse Servo | |
| <ul style="list-style-type: none"> · Seals (piston and cover) damaged | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> · Servo cover retaining ring damaged | |
| <ul style="list-style-type: none"> · Anchor pins (case) damaged | |
| Pump Assembly | |
| <ul style="list-style-type: none"> · Loose bolts | <ul style="list-style-type: none"> · Tighten bolts to specification. |
| <ul style="list-style-type: none"> · Porosity/cross leaks | <ul style="list-style-type: none"> · Inspect pump assembly. Replace as required. |
| <ul style="list-style-type: none"> · Gasket damaged | <ul style="list-style-type: none"> · Inspect for damage and replace. |
| <ul style="list-style-type: none"> · No. 1 and No. 2 seal rings damaged | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| Reverse Clutch Assembly | |
| <ul style="list-style-type: none"> · Seals, piston damaged | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> · Check ball missing or damaged | |
| <ul style="list-style-type: none"> · Friction elements damaged, worn | |
| <ul style="list-style-type: none"> · Return spring piston damaged, worn | |

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| Low Reverse Band | |
| · Band, servo, anchor pin damaged or worn | · Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

HARSH FORWARD ENGAGEMENT

| Possible Component | Reference/Action |
|---|--|
| 204 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| · Electrical inputs/outputs, vehicle wiring harnesses, PCM, TFT sensor, EPC solenoid | · Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual ¹ for diagnosis. Perform engagement test, EPC test and Pinpoint Tests B and E using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 304 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| · Improper level | · Adjust fluid to proper level. |
| · Condition | · Inspect as described under Fluid Condition Check. |
| Improper Pressures | |
| · High forward clutch pressure, high line pressure, high EPC pressure | · Check pressure at line, EPC and forward pressure taps. Refer to Reference: Pressure Chart #401 for specifications. If pressures are high, check the following possible components: main controls, pump assembly. |
| Main Controls | |
| · Main regulator valve, 2-3 backout valve, 2-3 accumulator seal/retainer stuck, damaged | · Inspect and service as required. |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Gaskets damaged | · Inspect for damage and replace. |
| · EPC solenoid stuck or damaged | · Inspect for damage or contamination. Perform EPC test in Routine No. 204. Service as required. |
| Pump Assembly | |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Porosity/cross leaks | · Inspect for porosity/leaks. Replace pump assembly as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| · No. 3 and No. 4 seal ring damage | |
| Forward Clutch Assembly | |
| · Check balls missing or damaged | · Inspect for mislocation, poor seating, damage. Replace forward clutch cylinder. |
| · Friction element damaged or worn | · Inspect for damage. Service as required. |
| · Forward clutch wave spring damaged | · Inspect for damage. Service as required. |
| · Forward clutch return spring damaged | · Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

DELAYED/SOFT REVERSE ENGAGEMENT

| Possible Component | Reference/Action |
|---|---------------------------------|
| 205 — ELECTRICAL ROUTINE | |
| · No Electrical Concerns | |
| 305 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| · Improper level | · Adjust fluid to proper level. |

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| · Condition | · Inspect as described under Fluid Condition Check. |
| Shift Linkage | |
| · Damaged, out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| · Low reverse clutch pressure, low reverse band pressure, low line pressure | · Check pressure at line tap. Refer to Reference: Pressure Chart #401 for specifications. If pressures are low, check the following possible components: main controls, pump assembly, reverse clutch assembly, reverse servo. |
| Fluid Filter and Seal Assembly | |
| · Plugged, damaged | · Replace fluid filter and seal assembly. |
| · Fluid filter seal damaged | |
| Main Controls | |
| · No. 6 shuttle ball, 1-2 accumulator seals, manual valve, main regulator valve stuck or damaged | · Inspect for damage. Service as required. |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Low Reverse Servo | |
| · Seals (piston and cover) damaged | · Inspect for damage. Service as required. |
| · Servo cover retaining ring assembled wrong. | |
| Pump Assembly | |
| · Bolts out of torque specification | · Tighten bolts to specification. |
| · Porosity/cross leaks/ball missing or leaking | · Inspect pump assembly. Replace as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| · No. 1 and No. 2 seal rings damaged | · Inspect for damage. Service as required. |
| Reverse Clutch Assembly | |
| · Seals, piston damaged | · Inspect for damage. Service 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. Service as required. |

DELAYED/SOFT FORWARD ENGAGEMENT

| Possible Component | Reference/Action |
|---|--|
| 206 — ELECTRICAL ROUTINE | |
| · No Electrical Concerns | |
| 306 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| · Improper level | · Adjust fluid to proper level. |
| · Condition | · Inspect as described under Fluid Condition Check. |
| Shift Linkage | |
| · Damaged, out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |

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| <ul style="list-style-type: none"> · Low forward clutch pressure, low line pressure, low EPC pressure | <ul style="list-style-type: none"> · Check pressure at line, forward clutch and EPC taps. Refer to Reference: Pressure Chart #401 for specifications. If pressures are low, check the following possible components: fluid filter and seal assembly, main controls and pump assembly. |
| Fluid Filter and Seal Assembly <ul style="list-style-type: none"> · Plugged, damaged | <ul style="list-style-type: none"> · Replace fluid filter and seal assembly. |
| <ul style="list-style-type: none"> · Fluid filter seal damaged | |
| Main Controls <ul style="list-style-type: none"> · 3-4 shift valve, main regulator valve | <ul style="list-style-type: none"> · Inspect and service as required. |
| <ul style="list-style-type: none"> · Bolts out of torque specification | <ul style="list-style-type: none"> · Tighten bolts to specification. |
| <ul style="list-style-type: none"> · Gaskets damaged | <ul style="list-style-type: none"> · Inspect for damage and replace. |
| <ul style="list-style-type: none"> · 2-3 or 1-2 accumulator, bore damaged or stuck | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| Pump Assembly <ul style="list-style-type: none"> · Bolts out of torque specification | <ul style="list-style-type: none"> · Tighten bolts to specification. |
| <ul style="list-style-type: none"> · Porosity/cross leaks | <ul style="list-style-type: none"> · Inspect pump assembly. Replace as required. |
| <ul style="list-style-type: none"> · Gaskets damaged | <ul style="list-style-type: none"> · Inspect for damage and replace. |
| <ul style="list-style-type: none"> · No. 3, No. 4 seal rings damaged | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| Forward Clutch Assembly <ul style="list-style-type: none"> · Seals, piston damaged | <ul style="list-style-type: none"> · Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> · Check balls missing, damaged | <ul style="list-style-type: none"> · Inspect for mislocation, poor seating, damage. Replace cylinder as required. |
| <ul style="list-style-type: none"> · Friction elements damaged, worn | <ul style="list-style-type: none"> · Check for damage. Service as required. |

SHIFT CONCERNS: SOME OR ALL SHIFTS MISSING

| Possible Component | Reference/Action |
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| 210 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> · Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module, shift solenoids, output shaft speed (OSS) sensor, Digital TR sensor | <ul style="list-style-type: none"> · Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 310 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid <ul style="list-style-type: none"> · Improper level | <ul style="list-style-type: none"> · Adjust fluid to proper level. |
| <ul style="list-style-type: none"> · Condition | <ul style="list-style-type: none"> · Inspect as described under Fluid Condition Check. |
| Shift Linkage, Digital TR Sensor <ul style="list-style-type: none"> · Damaged, out of adjustment | <ul style="list-style-type: none"> · Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| | <ul style="list-style-type: none"> · Refer to the following shift routine(s) for further diagnosis: <ul style="list-style-type: none"> 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 |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: SHIFT TIMING — EARLY/LATE

| Possible Component | Reference/Action |
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| 211 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module , shift solenoids, EPC solenoid, TFT sensor, OSS | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, B, E and F using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. |
| 311 — HYDRAULIC/MECHANICAL ROUTINE | |
| Other <ul style="list-style-type: none"> Tire size change, axle ratio change | <ul style="list-style-type: none"> Verify vehicle has original equipment. Refer to Certification Label and Safety Standard Certification Label. Changes in tire size, axle ratio will affect shift timing. |
| Fluid <ul style="list-style-type: none"> Improper level Condition | <ul style="list-style-type: none"> Adjust fluid to proper level. Inspect as described under Fluid Condition Check. |
| Improper Pressures <ul style="list-style-type: none"> Line pressure, EPC pressure | <ul style="list-style-type: none"> Check pressure at line and EPC taps. Refer to Reference: Pressure Chart #401 for specifications. If not OK, check the main controls. If OK, 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 <ul style="list-style-type: none"> EPC solenoid, stuck or damaged hydraulically or mechanically Valves, accumulators, seals stuck or damaged or misassembled Gaskets damaged Solenoid screen (in valve body) blocked or damaged | <ul style="list-style-type: none"> Inspect for damage, contamination. Perform EPC tests in Routine No. 211. Service as required. Inspect for damage. Service as required. Inspect for damage and replace. Clean or replace screen. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: TIMING—ERRATIC/HUNTING

| Possible Component | Reference/Action |
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| 212 —ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module , shift solenoids, TCC solenoid, digital TR sensor, OSS | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130, with Rotunda Transmission Range (TR) Sensor Cable "E" 418-F107 (007-00111) and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 312 —HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid <ul style="list-style-type: none"> Improper level Condition | <ul style="list-style-type: none"> Adjust fluid to proper level. Inspect as described under Fluid Condition Check. |
| Main Controls | |

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| <ul style="list-style-type: none"> Valves, accumulators, seals, misassembled, stuck or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| <ul style="list-style-type: none"> Solenoid screen (in valve body) blocked or damaged | <ul style="list-style-type: none"> Clean or replace screen. |
| Torque Converter Clutch <ul style="list-style-type: none"> Torque converter | <ul style="list-style-type: none"> Refer to Hydraulic/Mechanical Routine 342, Converter Cycling/Shudder/Chatter. |
| Specific Shifts | <ul style="list-style-type: none"> Refer to the following shift routine(s) for further diagnosis: <ul style="list-style-type: none"> 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 |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: FEEL — SOFT/SLIPPING

| Possible Component | Reference/Action |
|---|--|
| 213 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module , EPC solenoid, OSS | <ul style="list-style-type: none"> Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests E and F using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. |
| 313 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid <ul style="list-style-type: none"> Improper level | <ul style="list-style-type: none"> Adjust fluid to proper level. |
| <ul style="list-style-type: none"> Condition | <ul style="list-style-type: none"> Inspect as described under Fluid Condition Check. |
| Improper Pressures <ul style="list-style-type: none"> Low line pressure, low EPC pressure | <ul style="list-style-type: none"> Check pressures at line and EPC taps. Refer to Reference: Pressure Chart #401 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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 1-2 accumulator, 2-3 backout valve, main regulator valve, overdrive servo regulator valve stuck, damaged or misassembled | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> EPC solenoid stuck or damaged | <ul style="list-style-type: none"> Inspect for damage and contamination. Perform EPC tests in Routine No. 213. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: FEEL — HARSH

| Possible Component | Reference/Action |
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| 214 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, EPC solenoid, OSS | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests E and F using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. |
| 314 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid <ul style="list-style-type: none"> Improper level Condition | <ul style="list-style-type: none"> Adjust fluid to proper level. Inspect as described under Fluid Condition Check. |
| Improper Pressures <ul style="list-style-type: none"> High line pressure, high EPC pressure | <ul style="list-style-type: none"> Check pressures at line and EPC taps. Refer to Reference: Pressure Chart #401 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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 1-2 accumulator, 2-3 backout valve, main regulator valve, overdrive servo regulator valve stuck, damaged or misassembled EPC solenoid stuck or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. Inspect for damage, contamination. Perform EPC tests in Routine 214. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: NO 1STGEAR, ENGAGES IN HIGHER GEAR

| Possible Component | Reference/Action |
|--|---|
| 215 —ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module , shift solenoids, digital TR sensor | <ul style="list-style-type: none"> Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A and D using Rotunda Transmission Tester 007-00130, with Rotunda Transmission Range (TR) Sensor Cable "E" 418-F107 (007-00111) and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. |
| 315 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor <ul style="list-style-type: none"> Damaged or out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures <ul style="list-style-type: none"> Low reverse clutch pressure, low reverse band pressure, low line pressure | <ul style="list-style-type: none"> Check for which pressures are on as follows and corresponding routines² : |
| <ul style="list-style-type: none"> Forward Off, Intermediate Off, Direct X | <ul style="list-style-type: none"> 324, 301 325, 301 323, 324, 325, 301 |

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| <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 324 • 325 • 323, 324, 325 • Refer to appropriate Mechanical Diagnosis |
| Mechanical <ul style="list-style-type: none"> • Bands, clutches or seals damaged or worn | <ul style="list-style-type: none"> • Refer to Transmission, Disassembly and Assembly. |

¹ Can be purchased as a separate item.

² X = pressures applied.

SHIFT CONCERNS: NO MANUAL 1ST GEAR

| Possible Component | Reference/Action |
|---|---|
| 216 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> • Electrical inputs/outputs, vehicle wiring harnesses, PCM, shift solenoids, Digital TR sensor | <ul style="list-style-type: none"> • Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A and D using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 316 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Cable, Digital TR Sensor <ul style="list-style-type: none"> • Damaged or out of adjustment | <ul style="list-style-type: none"> • Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures <ul style="list-style-type: none"> • Low reverse clutch pressure, low reverse band pressure, low line pressure, low EPC pressure | <ul style="list-style-type: none"> • Check pressure at line and EPC pressure taps. Refer to Reference: Pressure Chart #401 for specifications. If pressures are low, check the following possible components: oil filter and seal assembly, main controls, reverse clutch assembly and reverse servo assembly. |
| Oil Filter and Seal Assembly <ul style="list-style-type: none"> • Plugged or damaged | <ul style="list-style-type: none"> • Replace filter and seal assembly. |
| Main Controls <ul style="list-style-type: none"> • No. 6 shuttle ball, manual valve, main regulator valve, low servo modulator valve stuck, damaged | <ul style="list-style-type: none"> • Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> • Loose bolts | <ul style="list-style-type: none"> • Tighten bolts to specification. |
| <ul style="list-style-type: none"> • Gaskets damaged | <ul style="list-style-type: none"> • Inspect for damage and replace. |
| Low Reverse Servo <ul style="list-style-type: none"> • Seals (piston and cover) damaged | <ul style="list-style-type: none"> • Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> • Servo cover retaining ring damaged | |
| <ul style="list-style-type: none"> • Anchor pins (case) damaged | |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: NO MANUAL 2ND GEAR

| Possible Component | Reference/Action |
|---|---|
| 217 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module (PCM), shift solenoids, Digital TR sensor | <ul style="list-style-type: none"> Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A and D using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 317 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Cable, Digital TR Sensor <ul style="list-style-type: none"> Damaged, out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Main Controls <ul style="list-style-type: none"> 3-4 shift valve, 1-2 and 2-3 shift valve, 3-4 capacity modulator valve stuck, damaged or misassembled | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Bolts out of torque specification | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 1-2 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
|---|---|
| 220 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, MAF, TP, VSS, OSS, Digital TR sensor, shift solenoids, EI system | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 320 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor <ul style="list-style-type: none"> Damaged or out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures <ul style="list-style-type: none"> Intermediate clutch pressure, line pressure | <ul style="list-style-type: none"> Check pressure at line and intermediate clutch taps. Refer to Reference: Pressure Chart #401 for specifications. If not OK, check the Main Controls. |
| Main Controls <ul style="list-style-type: none"> 1-2 shift valve, 1-2 accumulator valve stuck or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Loose bolts | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> SS1 malfunction | <ul style="list-style-type: none"> Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| <ul style="list-style-type: none"> Gasket damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| <ul style="list-style-type: none"> No. 8 ball not seating | <ul style="list-style-type: none"> Inspect for damage and service as required. |
| Pump <ul style="list-style-type: none"> Porosity/cross leaks, balls missing, damaged or leaking | <ul style="list-style-type: none"> Inspect for porosity/leaks, balls missing. Replace pump as required. |

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| · Gasket damaged | · Inspect for damage and replace. |
| Intermediate Clutch Assembly | |
| · Seals damaged | · Inspect for damage. Service as required. |
| · Piston damaged | · Inspect for damage. Service as required. |
| · Friction elements damaged or worn | · Inspect for damage. Service as required. |
| Intermediate One-Way Clutch Assembly | |
| · Not holding or damaged | · Inspect for damage. Service as required. |
| Low One-Way Clutch Assembly | |
| · Not overrunning or damaged | · Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 2-3 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
|--|---|
| 221 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| · Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, shift solenoids, EI system | · Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual ¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 321 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage | |
| · Damaged or out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| · Direct clutch pressure | · Check pressure at direct clutch tap. Refer to Reference: Pressure Chart #401 for specifications. If not OK, check the main controls. |
| Main Controls | |
| · 2-3 shift valve, check ball No. 3 or No. 9, solenoid pressure regulator valve, 2-3 backout valve, 2-3 modulator valve, damaged or misassembled | · Inspect for damage. Service as required. |
| · Loose bolts | · Tighten bolts to specification. |
| · SS2 malfunction | · Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| · Output shaft seals damaged or cup plug leaking or missing | · Inspect for damage and service as required. |
| · 2-3 accumulator damaged or stuck | · Inspect piston seal and bore for damage. Service as required. |
| · Solenoid screen (in main control) blocked or damaged | · Clean or replace screen. |
| Intermediate One-Way Clutch Assembly | |
| · Not overrunning or damaged | · Inspect for damage. Service as required. |
| Output Shaft | |
| · Seal rings damaged | · Inspect for damage. Service as required. |
| · Cup plug damaged or missing | |
| Direct Clutch Assembly | |
| · Seals or piston damaged | · Inspect for damage. Service as required. |

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| · Friction elements worn or damaged | · Inspect for damage. Service as required. |
| · Check ball not seating | · Inspect for damage. Service as required. |
| · Return spring assembly damaged | · Inspect for damage. Service as required. |
| Case | |
| · Output shaft rear seals leaking or damaged | · Inspect for damage. Service as required. Inspect case for damaged seal area. If damaged, replace case. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 3-4 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
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| 222 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, TCS, shift solenoids, EI system | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self-test. |
| 322 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor | |
| <ul style="list-style-type: none"> Damaged or out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures | |
| <ul style="list-style-type: none"> Forward clutch pressure, direct clutch pressure, line pressure | <ul style="list-style-type: none"> Check line, direct and forward clutch pressures at appropriate taps. Refer to Reference: Pressure Chart #401 for specifications. If pressures are out of specification, check main controls. |
| Main Controls | |
| <ul style="list-style-type: none"> 3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator valve, 2-3 backout valve, 1-2 and 2-3 shift valves stuck, damaged | <ul style="list-style-type: none"> Inspect for damaged and service as required. |
| <ul style="list-style-type: none"> Loose bolts | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> SS1 or SS2 malfunction | <ul style="list-style-type: none"> Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| <ul style="list-style-type: none"> OD servo cover, rod and piston cushion spring or seals damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> No's 2, 4, 7, and 9 check balls damaged or missing | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Solenoid screen (in main control) blocked or damaged | <ul style="list-style-type: none"> Clean or replace screen. |
| Pump | |
| <ul style="list-style-type: none"> Porosity/cross leaks, balls missing, damaged or leaking | <ul style="list-style-type: none"> Inspect for porosity/leaks, balls missing. Replace pump as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage. Replace as required. |
| OD Band | |
| <ul style="list-style-type: none"> OD band and reverse clutch drum assembly damaged, worn | <ul style="list-style-type: none"> Inspect for damage and service as required. |
| <ul style="list-style-type: none"> Intermediate one-way clutch assembly damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Forward Clutch Assembly | |

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| · Seals or piston damaged | · Inspect for damage. Service as required. |
| · Friction elements worn or damaged | · Inspect for damage. Service as required. |
| · Check ball stuck, damaged or not seating properly | · Inspect for damage. Service as required. |
| Input Shaft | |
| · Seals damaged | · Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 4-3 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
|---|--|
| 223 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, TCS, shift solenoids, EI system. | <ul style="list-style-type: none"> Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self test. |
| 323 — HYDRAULIC/MECHANICAL ROUTINE | |
| Improper Pressures | |
| <ul style="list-style-type: none"> Forward clutch pressure, line pressure | <ul style="list-style-type: none"> Check line and forward clutch at pressure taps. Refer to Reference: Pressure Chart #401 for specifications. If out of specification, check main controls. |
| Main Controls | |
| <ul style="list-style-type: none"> 3-4 shift valve, solenoid pressure regulator valve, OD servo regulator, 3-4 capacity modulator, 2-3 backout valve, 1-2, 2-3 shift valves stuck, damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Check balls No. 2, No. 7, No. 9 damaged, missing or not seating properly | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Loose bolts | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> SSA/SS1, malfunction | <ul style="list-style-type: none"> Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| <ul style="list-style-type: none"> OD servo, seal, rod damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Solenoid screen (in main control) blocked or damaged | <ul style="list-style-type: none"> Clean or replace screen. |
| Pump | |
| <ul style="list-style-type: none"> Porosity/cross leaks, balls missing, damaged or leaking | <ul style="list-style-type: none"> Inspect for porosity/leaks, balls missing. Replace pump as required. |
| <ul style="list-style-type: none"> Seal rings damaged. | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| Overdrive Band | |
| <ul style="list-style-type: none"> OD band and reverse clutch assembly damaged, worn | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Intermediate one-way clutch assembly damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Forward Clutch Assembly | |
| <ul style="list-style-type: none"> Seals or piston damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Friction elements damaged, worn | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Check ball stuck, damaged or not seating properly | <ul style="list-style-type: none"> Inspect for damage. Service as required. |

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| <ul style="list-style-type: none"> Forward clutch piston and return spring damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Input Shaft <ul style="list-style-type: none"> Seals damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 3-2 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
|--|--|
| 224 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, shift solenoids, EI system. | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self test. |
| 324 — HYDRAULIC/MECHANICAL ROUTINE | |
| Improper Pressures <ul style="list-style-type: none"> Direct clutch | <ul style="list-style-type: none"> Check pressure at direct clutch tap. Refer to Reference: Pressure Chart #401 for specifications. If not within specification, check Main Controls. |
| Main Controls <ul style="list-style-type: none"> 2-3 shift valve stuck or damaged Check balls damaged or missing Loose bolts SSB/SS2 malfunction Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required Inspect for damage. Service as required. Tighten bolts to specification. Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. Inspect for damage and replace. |
| Intermediate One-Way Clutch <ul style="list-style-type: none"> Not holding or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Direct Clutch Assembly <ul style="list-style-type: none"> Seals or piston damaged Friction element damaged, worn Check ball stuck, damaged or not seating properly | <ul style="list-style-type: none"> Inspect for damage. Service as required. Inspect for damage. Service as required. Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

SHIFT CONCERNS: 2-1 SHIFT (AUTOMATIC)

| Possible Component | Reference/Action |
|--|--|
| 225 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, shift solenoids, EI system. | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self test. |
| 325 — HYDRAULIC/MECHANICAL ROUTINE | |
| Improper Pressures | |

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| <ul style="list-style-type: none"> Intermediate clutch | <ul style="list-style-type: none"> Check pressure at intermediate clutch tap. Refer to Reference: Pressure Chart #401 for specifications. If not within specifications, check Main Controls and Pump. |
| Main Controls <ul style="list-style-type: none"> 1-2 shift valve, 1-2 accumulator solenoid pressure regulator valve stuck, damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Loose bolts | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> SS1 malfunction | <ul style="list-style-type: none"> Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage; service as required. |
| <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| Pump <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| <ul style="list-style-type: none"> Porosity/cross leaks | <ul style="list-style-type: none"> Inspect for leak/porosity. Replace pump as required. |
| Intermediate Clutch Assembly <ul style="list-style-type: none"> Piston damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Friction elements damaged, worn | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> End clearance improper | <ul style="list-style-type: none"> Inspect and correct as described under Transmission, Assembly |
| Intermediate One-Way Clutch <ul style="list-style-type: none"> Damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Low One-Way Clutch <ul style="list-style-type: none"> Not holding or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |

¹ Can be purchased as a separate item.

TORQUE CONVERTER OPERATION CONCERN: NO APPLY

| Possible Component | Reference/Action |
|--|--|
| 240 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, TFT sensor, TCC solenoids, EI system. | <ul style="list-style-type: none"> Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Tests B, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self test. |
| 340 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage <ul style="list-style-type: none"> Damaged, out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Improper Pressures <ul style="list-style-type: none"> Low line pressure, low EPC pressure | <ul style="list-style-type: none"> Check pressure at line and EPC taps. Refer to Reference: Pressure Chart #401 for specifications. If pressure is low, check EPC and main regulator valve. If within specification, check Main Controls. |
| Main Controls <ul style="list-style-type: none"> Solenoid pressure regulator valve, manual valve, torque converter clutch control valve and plunger, converter pressure limit valve, drain back valve stuck, damaged | <ul style="list-style-type: none"> Inspect for damage and service as required. |
| <ul style="list-style-type: none"> Loose bolts | <ul style="list-style-type: none"> Tighten bolts to specification. |
| <ul style="list-style-type: none"> Solenoid screen (in valve body) blocked or damaged | <ul style="list-style-type: none"> Clean or replace screen. |

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| · TCC solenoid malfunction | · Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Pump Assembly | |
| · Loose bolts | · Tighten bolts to specification. |
| · Porosity/cross leaks, balls leaking | · Inspect for porosity/leaks, ball missing. Replace pump as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Input Shaft | |
| · Seals damaged | · Inspect for damage. Service as necessary. |
| Torque Converter Assembly | |
| · Leakage, friction material damaged, internal seals damaged | · Inspect torque converter as described. Service or replace as required. |

¹ Can be purchased as a separate item.

TORQUE CONVERTER OPERATION CONCERN: ALWAYS APPLIED/STALLS VEHICLE

| Possible Component | Reference/Action |
|--|---|
| 241 — ELECTRICAL ROUTINE | |
| Powertrain Control System | |
| · Electrical inputs/outputs, vehicle wiring harnesses, PCM, TP, MAF, VSS, OSS, Digital TR sensor, TCS, shift solenoids, EI system. | · Run self-test. Refer to Powertrain Control/Emissions Diagnosis Manual ¹ for diagnosis. Perform Pinpoint Tests A, D and F using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun self test. |
| 341 — HYDRAULIC/MECHANICAL ROUTINE | |
| Main Controls | |
| · Drain back valve, torque converter clutch and plunger stuck, damaged | · Inspect for damage and service as required. |
| · Loose bolts | · Tighten bolts to specification. |
| · TCC solenoid malfunction | · Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| · No. 7 ball improper seating | · Inspect for damage. Service as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Pump Assembly | |
| · Loose bolts | · Tighten bolts to specification. |
| · Ball missing, leaking, porosity/cross leaks | · Inspect for porosity/leaks, balls missing. Replace pump as required. |
| · Gaskets damaged | · Inspect for damage and replace. |
| Input Shaft | |
| · Seals damaged | · Inspect for damage. Service as required. |
| Torque Converter Assembly | |
| · No end clearance | · Inspect converter as described and replace as required. |
| · Piston plate damaged or stuck to cover | · If cover is heat-stained, replace converter. |

¹ Can be purchased as a separate item.

TORQUE CONVERTER OPERATION CONCERN: CYCLING/SHUDDER/CHATTER

| Possible Component | Reference/Action |
|--------------------------------|------------------|
| 242 —ELECTRICAL ROUTINE | |

| | | |
|--|---|--|
| Powertrain Control System | <ul style="list-style-type: none"> Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module, torque converter clutch (TCC) solenoid, OSS | <ul style="list-style-type: none"> Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Test F using Rotunda Transmission Tester 007-00130 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. |
| 342 —HYDRAULIC/MECHANICAL ROUTINE | | |
| Fluid | <ul style="list-style-type: none"> Condition | <ul style="list-style-type: none"> Inspect fluid condition. If burnt, drain fluid and converter. Replace fluid and filter assembly. Bring vehicle to normal operating temperature. Perform Transmission Drive Cycle Test as described. Perform Self-Test. If condition still exists, continue diagnostics. |
| Main Controls | <ul style="list-style-type: none"> Solenoid pressure regulator valve, No. 7 check ball, bypass clutch control valve and plunger, converter pressure limit valve stuck, damaged or misassembled | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| | <ul style="list-style-type: none"> Bolts out of torque specification | <ul style="list-style-type: none"> Tighten bolts to specification. |
| | <ul style="list-style-type: none"> Solenoid screen (in valve body) blocked or damaged | <ul style="list-style-type: none"> Clean or replace screen. |
| | <ul style="list-style-type: none"> TCC solenoid not functioning properly | <ul style="list-style-type: none"> Activate solenoid using transmission tester. If solenoid operation cannot be felt when placing hand on solenoid, replace solenoid. Inspect O-rings for damage. Service as required. |
| | <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| Pump Assembly | <ul style="list-style-type: none"> Bolts out of torque specification | <ul style="list-style-type: none"> Tighten bolts to specification. |
| | <ul style="list-style-type: none"> Porosity/cross leaks, balls missing or leaking | <ul style="list-style-type: none"> Inspect for porosity/leaks or balls missing. Replace pump assembly as required. |
| | <ul style="list-style-type: none"> Gaskets damaged | <ul style="list-style-type: none"> Inspect for damage and replace. |
| Input Shaft | <ul style="list-style-type: none"> Seals damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| Torque Converter | <ul style="list-style-type: none"> Excessive end clearance | <ul style="list-style-type: none"> Inspect converter as described. Replace as required. |

¹ Can be purchased as a separate item.

OTHER CONCERNS: NO ENGINE BRAKING IN 2ND GEAR, MANUAL 2ND OR MANUAL 1ST POSITION

| Possible Component | Reference/Action |
|---|---|
| 250 — ELECTRICAL ROUTINE | |
| <ul style="list-style-type: none"> No Electrical Concerns | |
| 350 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage | |
| <ul style="list-style-type: none"> Damaged or out of adjustment | <ul style="list-style-type: none"> Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Main Controls | |
| <ul style="list-style-type: none"> 3-4 shift valve, 1-2 and 2-3 shift valve, gaskets, 3-4 capacity modulator valve, stuck or damaged or misassembled | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> OD servo assembly damaged or stuck | <ul style="list-style-type: none"> Inspect cover, piston and seal for damage. Service as required. |
| Overdrive | |
| <ul style="list-style-type: none"> OD band, reverse clutch drum assembly worn or damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |
| <ul style="list-style-type: none"> Intermediate overrunning clutch assembly damaged | <ul style="list-style-type: none"> Inspect for damage. Service as required. |

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| Reverse Band (Manual 1st Only) · Damaged, misadjusted | · Inspect for damage. Service as required. |
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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 out of adjustment | · Inspect and service as required. Verify linkage adjustment as described in Section 07-05 . After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Manual Lever · Retaining pin damaged, nut loose, detent spring bent or damaged or PARK mechanism damaged | · Inspect for damage. Service as required. |
| Main Controls · Manual valve stuck or damaged | · Inspect for damage. Service as required. |
| · Bolts out of torque specification | · Tighten bolts to specification. |

OTHER CONCERNS: EXTERNAL LEAKS

| Possible Component | Reference/Action |
|--|---|
| 252 — ELECTRICAL ROUTINE | |
| Powertrain Control System · Electrical inputs/outputs, sensor seals leaking (Digital TR, OSS, VSS or transmission connector) | · Inspect for leakage and service as required. |
| 352 — HYDRAULIC/MECHANICAL ROUTINE | |
| Seals, Gaskets · Torque converter, pump assembly, pan, extension housing - gasket/seal, manual lever, fluid level indicator tube | · Locate source of leak. Service as required. |
| Other · Cooler fitting, pressure taps, converter drain plug, band anchor pins, cooler lines, case porosity, case cracked | · Locate source of leak. Service as required. |
| · Vent blocked or damaged | · Check vent for damage or blockage. Service as required. |

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 | · Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual ¹ for diagnosis. Perform Pinpoint Tests A, B and D using Rotunda Transmission Tester 007-00130 with Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service as required. Clear codes, road test and rerun Self-Test. Also refer to Routines 241/341 Torque Converter Operation Concern: Always Applied/Stalls Vehicle. |

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| 353 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor | |
| <ul style="list-style-type: none"> · Damaged or out of adjustment | <ul style="list-style-type: none"> · Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Verify Proper Shift Scheduling and Engagements | <ul style="list-style-type: none"> · Go to the appropriate Diagnostic Routines. |
| Torque Converter Clutch Always Applied | <ul style="list-style-type: none"> · Go to Hydraulic/Mechanical Routine 241/341. |
| Torque Converter Clutch | |
| <ul style="list-style-type: none"> · Damaged | <ul style="list-style-type: none"> · Inspect torque converter as described. Replace as described. |

¹ Can be purchased as a separate item.

OTHER CONCERNS: NOISE/VIBRATION—FORWARD OR REVERSE

| Possible Component | Reference/Action |
|--|---|
| 254 —ELECTRICAL ROUTINE | |
| <ul style="list-style-type: none"> · No Electrical Concerns | |
| 354 —HYDRAULIC/MECHANICAL ROUTINE | |
| For Noises/Vibrations That Change With Engine Speed: | |
| <ul style="list-style-type: none"> · Converter components | <ul style="list-style-type: none"> · Locate source of disturbance. Service as required. |
| <ul style="list-style-type: none"> · Fluid level (low) pump cavitation | |
| <ul style="list-style-type: none"> · Pump assembly | |
| <ul style="list-style-type: none"> · Engine drive accessories | |
| <ul style="list-style-type: none"> · Cooler lines grounding out | |
| <ul style="list-style-type: none"> · Flexplate | |
| For Noises/Vibrations That Change With Vehicle Speed: | |
| <ul style="list-style-type: none"> · Engine mounts loose or damaged | <ul style="list-style-type: none"> · Locate source of disturbance and service as required. |
| <ul style="list-style-type: none"> · Driveline concerns: <ul style="list-style-type: none"> ▪ u-joints ▪ rear axle ▪ suspension ▪ modifications | |
| <ul style="list-style-type: none"> · First Gear: <ul style="list-style-type: none"> ▪ low one-way clutch ▪ gearset ▪ friction elements | |
| <ul style="list-style-type: none"> · Second Gear: <ul style="list-style-type: none"> ▪ intermediate one-way clutch ▪ intermediate clutch piston bleed hole out of 12 O'clock position ▪ friction elements | |
| <ul style="list-style-type: none"> · Third Gear: <ul style="list-style-type: none"> ▪ torque converter ▪ anti-clunk spring ▪ friction elements | |

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|---|--|
| <ul style="list-style-type: none"> · Fourth Gear: <ul style="list-style-type: none"> ▪ gear set ▪ friction elements ▪ torque converter | |
| <ul style="list-style-type: none"> · Reverse: <ul style="list-style-type: none"> ▪ gear set ▪ friction elements | |
| <ul style="list-style-type: none"> · Output shaft splines worn or damaged | <ul style="list-style-type: none"> · For specific shift or torque converter concerns, refer to the following routine(s) for further diagnosis: <p style="margin-left: 40px;"> 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 </p> |
| Other Noises/Vibrations: <ul style="list-style-type: none"> · Main Controls, valve resonance | |
| <ul style="list-style-type: none"> · Shift Cable: <ul style="list-style-type: none"> ▪ vibration ▪ grounding ▪ cooler lines ▪ grounding | <ul style="list-style-type: none"> · Locate source of disturbance and service as required. |

OTHER CONCERNS: ENGINE WILL NOT CRANK

| Possible Component | Reference/Action |
|--|--|
| 255 — ELECTRICAL ROUTINE | |
| Powertrain Control System <ul style="list-style-type: none"> · Electrical inputs/outputs, vehicle wiring harnesses, engine starting system hardware, Digital TR sensor | <ul style="list-style-type: none"> · Run Self-Test. Refer to Powertrain Control/Emissions Diagnosis Manual¹ for diagnosis. Perform Pinpoint Test D using Rotunda Transmission Range (TR) Sensor Cable "E" 007-00111 and Digital (TR) Sensor Overlay 007-00131 or equivalent, as described. Service and adjust as required. |
| 355 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor <ul style="list-style-type: none"> · Damaged or out of adjustment | <ul style="list-style-type: none"> · Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |

¹ Can be purchased as a separate item.

OTHER CONCERNS: NO PARK RANGE

| Possible Component | Reference/Action |
|--|------------------|
| 256 — ELECTRICAL ROUTINE | |
| <ul style="list-style-type: none"> · No Electrical Concerns | |
| 356 — HYDRAULIC/MECHANICAL ROUTINE | |
| Shift Linkage, Digital TR Sensor | |

| | |
|--|---|
| <ul style="list-style-type: none"> · Damaged or out of adjustment | <ul style="list-style-type: none"> · Inspect and service as required. Verify linkage adjustment as described in Section 07-05. After servicing linkage, verify that the Digital TR sensor is properly adjusted. Refer to Digital Transmission Range (TR) Sensor. |
| Park Mechanism <ul style="list-style-type: none"> · Output shaft ring, park brake pawl, parking pawl return spring, park rod guide cup, parking pawl shaft, parking pawl actuating rod, manual lever, manual lever detent spring damaged or misassembled | <ul style="list-style-type: none"> · Inspect for damage or misassembly and service as required. |

OTHER CONCERNS: TRANSMISSION OVERHEATING

| Possible Component | Reference/Action |
|---|--|
| 257 — ELECTRICAL ROUTINE | |
| Refer to Routine 240/340, Torque Converter Operation Concern: No Apply | |
| 357 — HYDRAULIC/MECHANICAL ROUTINE | |
| Fluid | |
| <ul style="list-style-type: none"> · Improper level | <ul style="list-style-type: none"> · Adjust fluid to proper level. |
| <ul style="list-style-type: none"> · Condition | <ul style="list-style-type: none"> · Inspect as described under Fluid Condition Check. |
| Cooler Lines | |
| <ul style="list-style-type: none"> · Damaged, blocked or reversed | <ul style="list-style-type: none"> · Inspect for damage and proper installation. Service as required. |
| Auxiliary Cooler | |
| <ul style="list-style-type: none"> · Damaged, blocked or restricted or improperly installed | <ul style="list-style-type: none"> · Inspect for damage and proper installation. Service as required. |
| Vehicle Concerns Causing Engine Overheating | |
| | <ul style="list-style-type: none"> · Refer to Section 03-03. |
| Main Controls | |
| <ul style="list-style-type: none"> · Drain back valve, torque clutch control valve, converter limit valve stuck, damaged or misassembled | <ul style="list-style-type: none"> · Inspect for damage and service as required. |
| Torque Converter | |
| <ul style="list-style-type: none"> · No Apply | <ul style="list-style-type: none"> · Refer to Routine 240/340. |