

08 GRP01 All Transmissions

| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|---|------------|---|---|---|---|----------|
| Transmission Fluid Temperature | | | | | | |
| Transmission Fluid Temperature Sensor Circuit Range/Performance | P0711 | This test detects performance of the transmission fluid temperature sensor by comparing changes in temperature from start up and between samples to calibration values. | <p>For Case 1 (Stuck sensor after cold start-up) Change from start-up temperature ≤ 2 deg. C for ≥ 100 seconds AND vehicle speed ≥ 8 KPH for ≥ 300 seconds.</p> <p>For Case 2 (Stuck sensor after warm start-up) Change from start-up temperature ≤ 3 deg. C for ≥ 100 seconds AND vehicle speed ≥ 8 KPH for ≥ 300 seconds.</p> <p>For Case 3 (Noisy sensor) Change from previous temperature is ≥ 20 deg. C for 14 events in < 7 seconds.</p> <p>For Case 4 (Doesn't warm up to at least 20 deg. C) Time Enabled Criteria met AND transmission fluid temperature < 20 deg. C. Time Enabled Criteria is determined by a lookup table ranging from 250 seconds when start-up temperature is ≥ 20 deg. C to 2200 seconds when start-up temperature is ≤ -40 deg. C.</p> <p>For Case 5 (Reasonableness at start-up): At start-up (with no abnormal powerdown condition), when engine speed > 500 RPM AND $(-39 \text{ deg. C} < \text{ECT} < 50 \text{ deg. C})$ for a duration ≥ 2 seconds, then if $(\text{ABS}(\text{IAT}-\text{ECT}) \leq 6 \text{ deg. C})$ AND $(\text{ECT}-\text{TFT}) > 40 \text{ deg. C}$ OR if $(\text{ABS}(\text{IAT}-\text{ECT}) > 6 \text{ deg. C})$ AND $(\text{ECT}-\text{TFT}) > 60 \text{ deg. C}$.</p> | <p>All Cases No TFT Perf DTC (P0711) for this drive cycle. No Fault Active TFT Perf DTC (P0711). No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Output Speed Sensor DTC (P0721, P0722) for this drive cycle. No Fault Pending Output Speed Sensor DTC (P0721, P0722) for this drive cycle. No FCC Stuck On DTC (P0742) No Pass TFT Perf DTC (P0711) for this drive cycle. Components powered and $9 \text{ V} < \text{Battery Voltage} < 18 \text{ V}$ $200 \text{ RPM} < \text{Engine Speed} < 7500 \text{ RPM}$ for 5 seconds Start-up transmission fluid temperature is available Transmission fluid temperature is between -39 deg. C and 149 deg. C ECT is not defaulted</p> <p>For Case 1 (Stuck sensor after cold start-up), Start-up transmission fluid temperature is between -40 deg. C and 21 deg. C. Slip $\geq 120 \text{ RPM}$ for ≥ 300 seconds. ECT $\geq 70 \text{ deg. C}$ and ECT change from start-up $\geq 15 \text{ deg. C}$.</p> <p>For Case 2 (Stuck sensor after warm start-up), Start-up transmission fluid temperature is between 115 deg. C and 150 deg. C. Slip $\geq 120 \text{ RPM}$ for ≥ 300 seconds. ECT $\geq 70 \text{ deg. C}$ and ECT change from start-up $\geq 55 \text{ deg. C}$.</p> <p>For Case 4 (Doesn't warm up to at least 20 deg. C), $150 \text{ Nm} \leq \text{net engine torque} \leq 1492 \text{ Nm}$ $22 \text{ KPH} \leq \text{vehicle speed} \leq 512 \text{ KPH}$ $10.5\% \leq \% \text{throttle} \leq 100\%$ $500 \text{ RPM} \leq \text{engine speed} \leq 6500 \text{ RPM}$ $-39 \text{ deg. C} \leq \text{ECT} \leq 149 \text{ deg. C}$</p> <p>For Case 5 (Reasonableness at start-up): IAT is not defaulted</p> | <p>Case 1: 75 seconds</p> <p>Case 2: 75 seconds</p> <p>Case 3: 7 seconds</p> <p>Case 4: Min. 350 seconds</p> <p>Case 5: 2 seconds</p> <p>250 ms</p> | B |
| Transmission Fluid Temperature Sensor Circuit Low Input | P0712 | This test detects low voltage on transmission fluid temperature sensor by comparing to a calibration value. Low voltage signal occurs at high temperature. | Trans Fluid Temp $\geq 150 \text{ deg. C}$ for > 2.5 seconds. | <p>No TFT DTCs (P0711, P0712, P0713) for this drive cycle.</p> <p>$200 \text{ RPM} < \text{Engine Speed} < 7500 \text{ RPM}$ for 5 seconds Components powered and $9 \text{ V} < \text{Battery Voltage} < 18 \text{ V}$</p> | <p>2.5 seconds</p> <p>250 ms</p> | B |
| Transmission Fluid Temperature Sensor Circuit High Input | P0713 | This test detects high voltage on transmission fluid temperature sensor by comparing to a calibration value. High voltage signal occurs at low temperature. | Trans Fluid Temp $\leq -45 \text{ deg. C}$ for > 2.5 seconds. | <p>No TFT DTCs (P0711, P0712, P0713) for this drive cycle</p> <p>$200 \text{ RPM} < \text{Engine Speed} < 7500 \text{ RPM}$ for 5 seconds Components powered and $9 \text{ V} < \text{Battery Voltage} < 18 \text{ V}$ If Engine running ≤ 600 seconds, then Engine Coolant Temperature must be $> 20 \text{ deg. C}$ and not defaulted for ≥ 20 seconds.</p> | <p>2.5 seconds</p> <p>250 ms</p> | B |

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|--|------------|---|---|--|--|----------|
| Speed Sensors | | | | | | |
| Input/Turbine Speed Sensor Circuit Range/Performance | P0716 | This test detects large changes in Input Speed and noisy Input Speed by comparing to calibration values. | <p>For Case 1: (Unrealistically large changes in input speed) Change of Input Speed between samples \geq 800 RPM for \geq 0.15 seconds</p> <p>For Case 2: (Noisy Input Speed) For 80 samples, if the change in Input Speed \leq -800 RPM, then the Low Counter is incremented. If the change in Input Speed is \geq 800 RPM, then the High Counter is incremented. This test fails if both the Low Counter and the High Counter are \geq 5 OR High Counter \geq 5</p> <p>For Case 3: (Wires to speed sensors swapped) Increment counter when range attained and range commanded are neutral for \leq 3.5 seconds AND when ratio of engine speed and input speed \geq 3. Arm test when counter \geq 20 or when time $>$ 3.5 seconds. Malfunction is reported when, for a time $>$ 0.5 seconds, the range commanded is not neutral and the on-coming clutch control is complete and the input speed $>$ 100 RPM and engine speed $>$ 100 RPM</p> | <p>All cases</p> <p>No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Fault Pending Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>Shifting complete</p> <p>For Case 1 (Unrealistically large changes in input speed) and Case 2 (Noisy Input Speed), Input Speed $>$ 200 RPM for \geq 0.5 seconds</p> <p>For Case 3 (Wires to speed sensors swapped), Input speed $>$ 100 RPM Engine speed $>$ 100 RPM Hydraulic system pressurized Enables met and no Input Speed Sensor DTCs for \geq 0.2 seconds</p> | <p>For Case 1: 0.15 s</p> <p>For Case 2: 2 s</p> <p>For Case 3: 1 s</p> <p>25 ms</p> | A |
| Input/Turbine Speed Sensor Circuit No Signal | P0717 | This test detects unrealistically low value of input/turbine speed or unrealistically large changes in input/turbine speed. | <p>For Case 1: (Unrealistically large change in input speed) Failure pending if change in transmission input speed \geq 800 RPM.</p> <p>For Case 2: (Unrealistically low value of input speed) Failure pending if transmission input speed $<$ 61 RPM. This test fails if input speed $<$ 61 RPM AND output speed $>$ 500 RPM for $>$ 1 second.</p> | <p>All Cases</p> <p>No Input Speed Sensor No Activity DTC (P0717) for this drive cycle. Reverse-to-Neutral shift not in process Shifting complete Engine is running Range attained is not neutral Transmission fluid temperature $>$ -25 deg. C</p> <p>For Case 2: (Unrealistically low input speed) No Incorrect Ratio DTCs (P0729, P0731 through P0736) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Fault Pending Output Speed Sensor DTCs (P0721, P0722). Transmission output speed \geq 150 RPM OR Transmission output speed \geq 150 RPM AND Engine Speed \geq 400 RPM</p> | <p>1 second</p> <p>25 ms</p> | A |
| Output Speed Sensor Circuit Range/Performance | P0721 | This test detects a noisy output speed sensor or circuit by detecting large changes in output speed. | <p>For Case 1: (Unrealistically large change in output speed) Change in output speed \geq 500 RPM for \geq 0.15 seconds</p> <p>For Case 2: (Noisy output speed) For 80 samples, if the change in output speed is \leq -500 RPM, then the Low Counter is incremented. If the change in output speed is \geq 500 RPM, then the High Counter is incremented. Test fails if both the Low Counter and the High Counter are \geq 5 or the Low Counter or the High Counter is \geq 5.</p> | <p>No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. Output Speed $>$ 200 RPM for \geq 0.5 seconds Shift complete and range attained NOT neutral</p> | <p>For Case 1: 0.15 s</p> <p>For Case 2: 2 seconds</p> <p>25 ms</p> | A |

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| Output Speed Sensor Circuit No Signal | P0722 | This test detects unrealistically low value of output speed or unrealistically large change in output speed. | <p>For Case 1: (Unrealistically large change in output speed) Failure pending if change in output speed \geq 600 RPM Failure sets if range attained is Neutral.</p> <p>For Case 2: (Unrealistically low value of output speed) Failure pending if output speed $<$ 61 RPM. Failure sets if not monitoring for low speed neutral and output speed $<$ 61 RPM and range is 3rd, 4th, 5th, or 6th for $>$ 1 second. Failure sets if not monitoring for low speed neutral and output speed $<$ 61 RPM and ((net engine torque $<$ -100 Nm OR net engine torque $>$ 100 Nm) OR (turbine speed $>$ 1500 RPM and range is 2nd)) for \geq 4 seconds.</p> | <p>All Cases No Output Speed Sensor Perf DTC (P0721) for this drive cycle.</p> <p>For Case 1: Unrealistically large change in output speed Test enabled when output speed \geq 600 RPM for \geq 1 seconds. Test disabled when output speed \leq 600 RPM for $>$ 1 seconds</p> <p>For Case 2: Unrealistically low value of output speed No Incorrect Ratio DTCs (P0729, P0731 through P0736) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. Engine is running Shift not in process Range attained is not Neutral Reverse to Neutral shift not in process Transmission fluid temperature $>$ -25 deg. C Transmission input speed \geq 1050 RPM Not waiting for Manual Selector Valve to attain forward range PRNDL State Not D4, nor Transitional D4, nor Transitional N</p> | <p>1 second</p> <p>25 ms</p> | A |
| Range Verification | | | | | | |
| Gear 1 Incorrect Ratio | P0731 | This test verifies transmission operating ratio while 1st range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |
| Gear 2 Incorrect Ratio | P0732 | This test verifies transmission operating ratio while 2nd range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |

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| Gear 3 Incorrect Ratio | P0733 | This test verifies transmission operating ratio while 3rd range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |
| Gear 4 Incorrect Ratio | P0734 | This test verifies transmission operating ratio while 4th range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |
| Gear 5 Incorrect Ratio | P0735 | This test verifies transmission operating ratio while 5th range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |
| Reverse Incorrect Ratio | P0736 | This test verifies transmission range while reverse range is commanded by comparing computed ratio to the commanded ratio. | <p>Accumulated event timer \geq 2 seconds. Timer accumulates when transmission in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No range switch response active Hydraulic System Pressurized Shift complete Output speed \geq 200 RPM No hydraulic default condition present Normal powertrain shutdown not in process Normal powertrain initialization is complete</p> | <p>2 seconds</p> <p>25 ms</p> | A |

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| Gear 6 Incorrect Ratio | P0729 | This test verifies transmission operating ratio while 6th range is commanded by comparing computed ratio to the commanded ratio. | <p>Pending failure occurs when accumulated event timer \geq 2 seconds. Timer accumulates when transmission is in forward or reverse range, output speed \geq 100 RPM, and gear slip $>$ 100 RPM. In response to pending failure, a diagnostic response range is commanded.</p> <p>During this command, this test fails if Abs(Converter Slip) \geq 230 RPM for $>$ 10 samples.</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle.</p> <p>No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle.</p> <p>No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle.</p> <p>No range switch response active</p> <p>Hydraulic System Pressurized</p> <p>Shift complete</p> <p>Output speed \geq 200 RPM</p> <p>No hydraulic default condition present</p> <p>Normal powertrain shutdown not in process</p> <p>Normal powertrain initialization is complete</p> | <p>2.25 seconds</p> <p>25 ms</p> | A |
| Torque Converter Clutch | | | | | | |
| Torque Converter Clutch Circuit Performance or Stuck Off | P0741 | This test detects the torque converter being stuck off (unlocked). | TCC Slip \geq 80 RPM for \geq 15 seconds. | <p>No TCC Circuit DTCs (P2761, P2763, P2764) for this drive cycle.</p> <p>No Fault Pending TCC Circuit DTCs (P2761, P2763, P2764) for this drive cycle.</p> <p>No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle.</p> <p>No Fault Pending Output Speed Sensor DTCs (P0721, P0722) for this drive cycle.</p> <p>No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>No Fault Pending Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>200 RPM $<$ Engine Speed $<$ 7500 RPM for 5 seconds</p> <p>Components powered and 9 V $<$ Battery Voltage $<$ 18 V</p> <p>Must be in forward range</p> <p>10 % $<$ % Throttle \leq 90 %</p> <p>Transmission fluid temperature between 5 deg. C and 130 deg. C</p> <p>Time Since Range Change \geq 6 seconds AND (TCC apply is complete.</p> | <p>15 s</p> <p>100 ms</p> | B |
| Torque Converter Clutch Circuit Stuck On | P0742 | This test detects the torque converter being stuck on (locked). | <p>Case 1: (High Torque condition) Set fault pending when throttle \geq 70% AND net engine torque \geq 275 Nm. Report malfunction when fault pending exists continuously for \geq 2 seconds.</p> <p>Case 2: (High Acceleration condition) Set fault pending when output shaft acceleration \geq 100 RPM/second. Report malfunction when fault pending exists continuously for \geq 5 seconds.</p> <p>Case 3: (Accel/Decel/Accel condition) Report malfunction when output acceleration event is followed by output deceleration event and followed by another output acceleration event. An output acceleration event occurs when output shaft acceleration \geq 40 RPM/second for \geq 4 seconds. An output deceleration event occurs when output shaft acceleration is \leq -40 RPM/second for \geq 2.5 seconds.</p> | <p>No TCC Circuit DTCs (P2761, P2763, P2764) for this drive cycle.</p> <p>No Fault Pending TCC Circuit DTCs (P2761, P2763, P2764) for this drive cycle.</p> <p>No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle.</p> <p>No Fault Pending Output Speed Sensor DTCs (P0721, P0722) for this drive cycle.</p> <p>No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>No Fault Pending Input Speed Sensor DTCs (P0716, P0717) for this drive cycle.</p> <p>No GMLAN SOH DTC (U0100) for this drive cycle.</p> <p>No Fault Pending GMLAN SOH DTC (U0100) for this drive cycle.</p> <p>200 RPM $<$ Engine Speed $<$ 7500 RPM for 5 seconds</p> <p>Components powered and 9 V $<$ Battery Voltage $<$ 18 V</p> <p>Must be in forward range</p> <p>TCC is off</p> <p>-20 RPM \leq TCC Slip \leq 20 RPM</p> <p>Throttle \geq 15%</p> <p>Net Engine Torque \geq 175 Nm</p> <p>Engine speed \leq 3500 RPM</p> <p>Input speed \leq 3500 RPM</p> <p>Output speed \geq 100 RPM</p> | <p>Case 1</p> <p>2 s</p> <p>Case 2</p> <p>5 s</p> <p>Case 3</p> <p>10.5 s</p> <p>100 ms</p> | B |

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|--|------------|--|--|--|---------------------------------|----------|
| Pressure Switches | | | | | | |
| Pressure Switch Solenoid 1 Circuit Low | P0842 | This test compares the commanded valve position to the PS1 pressure switch feedback. (part of S1 valve integrity test) | <p>Pending failure occurs when PS1 pressure switch indicates stroked for > 0.08 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to 0.125 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S1 valve is retried by triggering S1 valve command to stroked and back to destroyed. If PS1 pressure switch continues to indicate stroked, then one of three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS1 Circuit Low (P0793) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 1 (SS1) Valve Performance – Stuck On(P0752) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), SS1 valve retry attempted 15 times and PS1 pressure switch continues to indicate stroked.</p> | <p>S1 valve is destroyed</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown is NOT in process</p> | <p>100 ms</p> <p>25 ms</p> | A |
| Shift Solenoid 1 (SS1) Valve Performance – Stuck Off | P0751 | This test compares the change of state of the valve command to the change of state of the PS1 pressure switch feedback. (part of the S1 valve timeout test) | S1 valve is commanded from destroyed to stroked and the PS1 pressure switch indication remains destroyed for 5 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 12 seconds at transmission fluid temperature ≤ -40 deg. C.) | S1 valve commanded from destroyed to stroked. | <p>5 seconds</p> <p>25 ms</p> | A |
| Shift Solenoid 1 (SS1) Valve Performance – Stuck On | P0752 | This test compares the change of state of the valve command to the change of state of the PS1 pressure switch feedback. (part of the S1 valve timeout test). | S1 valve commanded from stroked to destroyed and the PS1 pressure switch indication remains stroked for > 6.6 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 11 seconds at transmission fluid temperature ≥ -40 deg. C.) | S1 valve changes from stroked to destroyed | <p>6.6 seconds</p> <p>25 ms</p> | A |
| Pressure Switch Solenoid 1 Circuit High | P0843 | This test compares the commanded valve position to the PS1 pressure switch feedback. (part of S1 valve integrity test) | <p>Pending failure occurs when PS1 pressure switch indicates destroyed for > 0.07 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to 5 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S1 valve is retried by triggering S1 valve command to destroyed and back to stroked. If the PS1 pressure switch continues to indicate destroyed, then one of three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS1 Control Circuit Low (P0793) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 1 (SS1) Valve Performance – Stuck Off (P0751) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), S1 valve retry attempted 15 times and PS1 pressure switch continues to indicate destroyed.</p> | <p>S1 valve is stroked</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown NOT in process</p> | <p>70 ms</p> <p>25 ms</p> | A |

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| Pressure Switch Solenoid 2 Circuit Low | P0847 | This test compares the commanded valve position to the PS2 pressure switch feedback (part of the S2 valve integrity test). | <p>Pending failure occurs when PS2 pressure switch indicates stroked for > 0.04004 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to .04 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S2 valve is retried by triggering S2 valve command to stroked and back to destroyed. If PS2 pressure switch continues to indicate stroked, then one of three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS2 Control Circuit Low (P0976) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 2 Valve Performance – Stuck On (P0757) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), S2 valve retry attempted 2 times and PS2 pressure switch continues to indicate stroked.</p> | <p>S2 valve is destroyed</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown is NOT in process</p> | <p>40 ms</p> <p>25 ms</p> | A |
| Shift Solenoid 2 Valve Performance – Stuck Off | P0756 | This test compares the change of state of the valve command to the change of state of the PS2 pressure switch feedback (part of the S2 valve timeout test). | If the S2 valve is commanded from destroyed to stroked and the PS2 pressure switch indication remains destroyed for 5 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 12 seconds at transmission fluid temperature ≤ -40 deg. C.) | S2 valve commanded from destroyed to stroked. | <p>5 seconds</p> <p>25 ms</p> | A |
| Shift Solenoid 2 Valve Performance – Stuck On | P0757 | This test compares the commanded valve position to the PS2 pressure switch feedback (part of the S2 valve timeout test). | S2 valve commanded from stroked to destroyed and the PS2 pressure switch does not indicate destroyed for > 6.4 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 15 seconds at transmission fluid temperature ≤ -40 deg. C.) | S2 valve changes from stroked to destroyed | <p>6.4 seconds</p> <p>25 ms</p> | A |
| Pressure Switch Solenoid 2 Circuit High | P0848 | This test compares the commanded valve position to the PS2 pressure switch feedback (part of the S2 valve integrity test). | <p>Pending failure occurs when PS2 pressure switch indicates destroyed for > 0.30 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to 5 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S2 valve is retried by triggering S2 valve command to destroyed and back to stroked. If PS2 pressure switch continues to indicate destroyed, then one of three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS2 Control Circuit Low (P0976) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 2 Valve Performance – Stuck Off (P0756) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), S2 valve retry attempted 2 times and PS2 pressure switch continues to indicate destroyed.</p> | <p>S2 valve is stroked</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown NOT in process</p> | <p>300 ms</p> <p>25 ms</p> | A |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|--|------------|---|--|--|---------------------------------|----------|
| Pressure Switch Solenoid 3 Circuit Low | P0872 | This test compares the commanded valve position to the PS3 pressure switch feedback. (part of S3 valve integrity test) | <p>Pending failure occurs when PS3 pressure switch indicates stroked for > 0.0195 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to 0.125 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S3 valve is retried by triggering S3 valve command to stroked and back to destroyed. If PS3 pressure switch continues to indicate stroked, then one of three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS3 Control Circuit Low(P0979) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 3 Valve Performance – Stuck On (P0762) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), S3 valve retry attempted 2 times and PS3 pressure switch continues to indicate stroked.</p> | <p>S3 valve is destroyed</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown is NOT in process</p> | <p>20 ms</p> <p>25 ms</p> | A |
| Shift Solenoid 3 Valve Performance – Stuck Off | P0761 | This test compares the change of state of the valve command to the change of state of the PS3 pressure switch feedback. (part of the S3 valve timeout test) | If the S3 valve is commanded from destroyed to stroked and the PS3 pressure switch indication remains destroyed for 5 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 12 seconds at transmission fluid temperature ≤ -40 deg. C.) | S3 valve commanded from destroyed to stroked. | <p>5 seconds</p> <p>25 ms</p> | A |
| Shift Solenoid 3 Valve Performance – Stuck On | P0762 | This test compares the commanded valve position to the PS3 pressure switch feedback (part of the S3 valve timeout test). | S3 valve commanded from stroked to destroyed and the PS3 pressure switch does not indicate destroyed for > 6.6 seconds at transmission fluid temperature ≥ 0 deg. C. (Time increases as temperature decreases with maximum time of 15 seconds at transmission fluid temperature ≥ -40 deg. C.) | S3 valve changes from stroked to destroyed | <p>6.6 seconds</p> <p>25 ms</p> | A |
| Pressure Switch Solenoid 3 Circuit High | P0873 | This test compares the commanded valve position to the pressure switch PS3 feedback. (part of S3 valve integrity test) | <p>Pending failure occurs when PS3 pressure switch indicates destroyed for > 0.30 seconds. (If a main pressure dropout is suspected or detected, then time limit increases to 5 seconds and 30 seconds, respectively.)</p> <p>In response to the pending failure, S3 valve is retried by triggering S3 valve command to destroyed and back to stroked. If PS3 pressure switch continues to indicate destroyed, then one of the three malfunction cases exists.</p> <p>For Case 1 (electrical malfunction), SS3 Control Circuit Low (P0979) reports failure, also.</p> <p>For Case 2 (mechanical malfunction), Shift Solenoid 3 Valve Performance – Stuck Off (P0761) reports failure, also.</p> <p>For Case 3 (intermittent malfunction), S3 valve retry attempted 2 times and PS3 pressure switch continues to indicate destroyed.</p> | <p>S3 valve is stroked</p> <p>NOT Cold initialization unless transmission fluid temperature > -25 deg. C Shutdown NOT in process</p> | <p>300 ms</p> <p>25 ms</p> | A |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|---|------------|---|--|--|--|----------|
| Pressure Switch Reverse Circuit Low | P0877 | This test detects Reverse Pressure Switch closed indication by comparing the Reverse Pressure Switch state to the PRNDL switch state. | <p>Case 1: (Forward range) For 100 samples (if dropouts detected, use 200 samples), PRNDL is in P, D1, D2, D3, D4, D5, D6, T8, or T4 AND RPS indicates Reverse for ≥ 1 seconds (if dropouts detected, use 30 seconds).</p> <p>Case 2: (Range indefinite) If for 20 samples, net engine torque ≥ 100 Nm when PRNDL is indefinitely D3 or another forward range for > 1 second</p> | <p>No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. No Range Switch Illegal Range DTC (P0708) for this drive cycle No Fault Pending Range Switch Illegal Range DTC (P0708) for this drive cycle. Engine is Running 200 RPM $<$ Engine Speed $<$ 7500 RPM for 5 seconds 9 V $<$ Battery Voltage $<$ 18 V Transmission Fluid Temperature ≥ 0 deg. C Hydraulic System is Pressurized Reverse Pressure Switch State indicates REVERSE</p> | <p>3 s</p> <p>50 ms</p> | A |
| Pressure Switch Reverse Circuit High | P0878 | This test detects the Reverse Pressure switch being stuck in the open position by comparing to the PRNDL switch state and detects the Reverse Pressure switch stuck open at shutdown. | <p>For Case 1: (RPS State and PRNDL State do not agree) For 40 samples, PRNDL is in R AND RPS indicates not Reverse after ≥ 1 second</p> <p>For Case 2: (RPS Shutdown Test) If RPS State is not Reverse for > 10 seconds at 0 deg. C. This time varies with transmission fluid temperature, from 5 seconds at temperature > 35 deg. C to 30 seconds at temperature < -20 deg. C.</p> | <p>For All Cases: Transmission Fluid Temperature ≥ 0 deg. C</p> <p>For Case 1: (RPS State and PRNDL State do not agree) No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle No Range Switch Illegal Range DTC (P0708) for this drive cycle No Fault Pending Range Switch Illegal Range DTC (P0708) for this drive cycle. 9 V $<$ Battery Voltage $<$ 18 V No range switch response active</p> <p>For Case 2: (RPS Shutdown Test) NOT (9 V $<$ Battery Voltage $<$ 18 V) Engine had been cranking or running this drive cycle Engine speed $<$ 50 RPM Turbine speed $<$ 50 RPM Output speed $<$ 50 RPM</p> | <p>Case 1: 3 s</p> <p>Case 2: 30s</p> <p>50 ms</p> | B |
| On-coming/Off-going Ratio | | | | | | |
| Pressure Control Solenoid 1 Controlled Clutch Stuck Off | P2723 | This test determines if the on-coming clutch energized by Pressure Control Solenoid 1 engages during a forward range shift. | Pending failure occurs when accumulated event timer ≥ 2 seconds. (For rough road conditions, use 2 seconds.) Timer accumulates when transmission is shifting, output speed ≥ 60 RPM, and commanded gear slip speed > 75 RPM. (For rough road conditions, use 150 RPM.) In response of pending failure, a diagnostic response range is commanded. During this command, this test fails if Converter slip \geq ABS(230) RPM for > 10 samples. | <p>No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed_Sensor DTCs (P0716, P0717) for this drive cycle. No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle.</p> <p>Hydraulic System Pressurized Output Speed ≥ 125 RPM Turbine Speed ≥ 60 RPM Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected On-coming clutch control enabled Power downshift abort to previous range NOT active</p> | <p>2.25 s</p> <p>25 ms</p> | A |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|---|------------|---|---|--|---------------------|----------|
| Pressure Control Solenoid 2 Controlled Clutch Stuck Off | P0776 | This test determines if the on-coming clutch energized by Pressure Control Solenoid 2 engages during a forward range shift. | Pending failure occurs when accumulated event timer \geq 2 seconds. (For rough road conditions, use 2 seconds.) Timer accumulates when transmission is shifting, output speed \geq 60 RPM, and commanded gear slip speed $>$ 75 RPM. (For rough road conditions, use 150 RPM.) In response of pending failure, a diagnostic response range is commanded. During this command, this test fails if Converter slip \geq ABS(230) RPM for $>$ 10 samples. | No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. Hydraulic System Pressurized Output Speed \geq 125 RPM Turbine Speed \geq 60 RPM Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected On-coming clutch control enabled Power downshift abort to previous range NOT active | 2.25 s 25 ms | A |
| Pressure Control Solenoid 1 Controlled Clutch Stuck On | P2724 | This test determines if the off-going clutch energized by Pressure Control solenoid 1 remains engaged during a forward range shift. | Accumulated fail timer \geq 0.2998 seconds for forward range upshift; \geq 3.0 seconds for direction change shifts; \geq 0.500 seconds for forward range closed throttle downshift; \geq 1.0 second for forward downshifts above closed throttle. Fail timer accumulates during range to range shifts when attained gear slip speed \leq 25 RPM | No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. Output Speed \geq 200 RPM Turbine Speed \geq 200 RPM Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected | 3 s 25 ms | A |
| Pressure Control Solenoid 2 Controlled Clutch Stuck On | P0777 | This test determines if the off-going clutch energized by Pressure Control solenoid 2 remains engaged during a forward range shift. | Accumulated fail timer \geq 0.2998 seconds for forward range upshift; \geq 3.0 seconds for direction change shifts; \geq 0.500 seconds for forward range closed throttle downshift; \geq 1.0 second for forward downshifts above closed throttle. Fail timer accumulates during range to range shifts when attained gear slip speed \leq 25 RPM | No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Input Speed Sensor DTCs (P0716, P0717) for this drive cycle. No Fault Pending Input Speed Sensor No Activity DTC (P0717) for this drive cycle. No Reverse Pressure Switch DTCs (P0877, P0878) for this drive cycle. Output Speed \geq 200 RPM Turbine Speed \geq 200 RPM Normal powertrain shutdown not in process Normal or Cold powertrain initialization is complete No range switch response active No Cold Mode operation No abusive garage shift to 1st range detected | 3 s 25 ms | A |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|---|------------|---|---|--|---|----------|
| PRNDL/IMS | | | | | | |
| Transmission Range Sensor High Input | P0708 | This test monitors the transmission range switch for invalid input conditions and parity errors occurring over consecutive ignition cycles. | <p>For Case 1 (No Information):</p> <p>Illegal electrical state for ≥ 1 second.</p> <p>For Case 2 (Long-term Parity):</p> <p>There are 3 counters for long-term parity. These counters are updated at the end of each drive cycle, immediately prior to TCM shutdown.</p> <p>For Counter 1, increment counter IF Parity Error Detected; decrement counter IF No Parity Error Detected AND No Motion Detected. IF Counter 1 ≥ 15 counts, THEN report failure.</p> <p>For Counter 2, increment counter IF Parity Error Detected AND (No Valid Drive Detected OR No Valid Park/Neutral Detected) AND Motion Detected; decrement counter IF No Parity Error Detected AND Valid Park/Neutral Detected AND Valid Drive Detected AND Motion Detected. IF Counter 2 ≥ 5 counts, THEN report failure.</p> <p>For Counter 3, increment Counter 3 IF Parity Error Detected while in Reverse AND No Valid Reverse Detected AND Motion Detected. Decrement Counter 3 IF No Parity Error Detected AND Valid Reverse Detected AND Motion Detected. IF Counter 3 ≥ 10 counts, THEN report failure.</p> <p>Where</p> <p>Parity Error Detected is defined as a failure of the 4-bit PRNDL input such that the sum of those bits yields an odd result for 30 seconds;</p> <p>Motion Detected is defined as output speed ≥ 200 RPM for 10 seconds;</p> <p>Valid Drive Detected is defined as the 4-bit DL indicates Valid Drive for 3 seconds;</p> <p>Valid Park Detected is defined as the 4-bit PRNDL indicates Valid Park for 0.2 seconds and output speed ≤ 20 RPM;</p> <p>Valid Reverse Detected is defined as the 4-bit PRNDL indicates Valid Reverse for 15 seconds;</p> <p>Valid Neutral Detected is defined as the 4-bit PRNDL indicates Valid Neutral for 0.2 seconds and output speed ≤ 20 RPM OR for 3 seconds.</p> | <p>200 RPM < Engine Speed < 7500 RPM for 5 seconds Components powered and 9 V < Battery Voltage < 18 V</p> | <p>Case 1:</p> <p>1 s</p> <p>Case 2:</p> <p>5th occurrence</p> <p>100 ms</p> | A |
| Transmission Range Sensor Circuit Range/Performance | P0706 | This test monitors the transmission range switch inputs at engine start to determine that it is indicating a valid starting position (Park or Neutral). | For > 7 events, PRNDL C input is closed OR PRNDL P is NOT closed. | <p>No Trans Range Ckt Range/Perf DTC (P0706) for this drive cycle.</p> <p>Battery voltage between 9V and 18V.</p> <p>Powertrain State is READY or CRANKING.</p> <p>100 RPM < Engine speed < 350 RPM.</p> | <p>200 ms</p> <p>25 ms</p> | B |

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| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|---|------------|--|--|---|----------------------|----------|
| Solenoid Electrical | | | | | | |
| Main Modulation/Line Pressure Control Solenoid Control Circuit Open | P0960 | This test detects solenoid electrical open circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If hardware fault is present for 200 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 5075 ms 25 ms | A |
| Main Modulation/Line Pressure Control Solenoid Control Circuit Low | P0962 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set at single electrical hardware fault to ground occurrence. If the electrical open test is enabled and an electrical hardware fault to ground is present for ≥ 200 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 5050 ms 25 ms | A |
| Main Modulation/Line Pressure Control Solenoid Control Circuit High | P0963 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for 3 consecutive samples. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 75 ms 25 ms | A |
| Pressure Control Solenoid 2 Control Circuit Open | P0964 | This test detects solenoid electrical open circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If hardware fault is present for 6 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 225 ms 25 ms | A |
| Pressure Control Solenoid 2 Control Circuit Low | P0966 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set at single electrical hardware fault to ground occurrence. If the electrical open test is enabled and an electrical hardware fault to ground is present for ≥ 6 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 200 ms 25 ms | A |
| Pressure Control Solenoid 2 Control Circuit High | P0967 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for 3 consecutive samples | No PCS2 Circuit High DTC (P0967) for this drive cycle. Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 75 ms 25 ms | A |
| Pressure Control Solenoid 1 Control Circuit Open | P2727 | This test detects solenoid electrical open circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If hardware fault is present for 5 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 200 ms 25 ms | A |
| Pressure Control Solenoid 1 Control Circuit Low | P2729 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set at single electrical hardware fault to ground occurrence. If the electrical open test is enabled and an electrical hardware fault to ground is present for ≥ 5 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 175 ms 25 ms | A |
| Pressure Control Solenoid 1 Control Circuit High | P2730 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for 3 consecutive samples | No PCS1 Circuit High DTC (P2730) for this drive cycle. Components powered and battery voltage between 9V and 18V. Extended cranking ≤ 4 seconds OR battery voltage ≤ 7 V or battery voltage ≥ 10 V Associated high side driver enabled and no associated high side driver DTCs. | 75 ms 25 ms | A |

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|---------------------------------------|------------|--|---|---|-----------------|----------|
| Shift Solenoid 1 Control Circuit Open | P0972 | This test detects solenoid electrical open circuit malfunctions. | Fault pending is set at single hardware fault occurrence. If hardware fault is present for ≥ 10 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 325 ms 25 ms | A |
| Shift Solenoid 1 Control Circuit Low | P0973 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set a single hardware fault to ground occurrence. If the electrical open test is enabled and electrical hardware fault to ground is present of ≥ 10 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 300 ms 25 ms | A |
| Shift Solenoid 1 Control Circuit High | P0974 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for ≥ 3 consecutive samples. | No SS1 Circuit High DTC (P0974) for this drive cycle. Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 75 ms 25 ms | A |
| Shift Solenoid 2 Control Circuit Open | P0975 | This test detects solenoid electrical open circuit malfunctions. | Fault pending is set at single hardware fault occurrence. If hardware fault is present for ≥ 10 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 325 ms 25 ms | A |
| Shift Solenoid 2 Control Circuit Low | P0976 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If the electrical open test is enabled and electrical hardware fault to ground is present of ≥ 10 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 300 ms 25 ms | A |
| Shift Solenoid 2 Control Circuit High | P0977 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for ≥ 3 consecutive samples. | No SS2 Circuit High DTC (P0977) for this drive cycle. Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 75 ms 25 ms | A |
| Shift Solenoid 3 Control Circuit Low | P0979 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If engine is cranking or running and hardware fault is present for ≥ 10 samples, then report malfunction. | No SS3 Circuit High or Low DTCs (P0979, P0978) for this drive cycle. Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. Commanded gear NOT Reverse Trim, 5 th or 6 th . | 250 ms 25 ms | A |
| Shift Solenoid 3 Control Circuit High | P0980 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for ≥ 3 consecutive samples. | No SS3 Circuit High DTC (P0980) for this drive cycle. Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. Commanded gear NOT Reverse Trim, 5 th or 6 th . | 75 ms 25 ms | A |
| Actuator Supply 1 (HSD1) Voltage Low | P0658 | This test detects low voltage when high voltage is expected indicating a short to ground at the circuit. | Report malfunction when the engine is running or cranking AND the number of failure events ≥ 3 . A failure event occurs when the number of failed solenoids connected to HSD1 ≥ 2 AND HSD1 voltage $< 6V$. | No (HSD1) Voltage Low DTC (P0658) this drive cycle. HSD1 Voltage High test (P0659) is running. HSD1 is commanded ON. Components powered and battery voltage between 9V and 18V. If engine is cranking, then crank time < 4 seconds OR battery voltage $> 10V$. | 75 ms 25 ms | A |

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|--|------------|--|--|---|----------------------|----------|
| Actuator Supply 1 (HSD1) Voltage High | P0659 | This test detects if the voltage measured at the HSD 2 detection circuit indicates high during initialization (when the circuit is off) or multiple low side detection circuits indicate open, but the high side detection circuit indicates high voltage. | At initialization, report malfunction when the number of failure events ≥ 3 . A failure event occurs when HSD1 voltage $\geq 6V$. After initialization, report malfunction when the engine is running or cranking AND the number of failure events ≥ 3 . A failure event occurs when the number of failed solenoids connected to HSD1 ≥ 2 AND HSD1 voltage $\geq 6V$. | After initialization . . . No (HSD1) Voltage Low DTC (P0658) this drive cycle. HSD1 Voltage Low test (P0658) is running. HSD1 is commanded ON. Components powered and battery voltage between 9V and 18V. If engine is cranking, then crank time < 4 seconds OR battery voltage > 10V. | 75 ms 25 ms | A |
| Actuator Supply2 (HSD2) Voltage Low | P2670 | This test detects low voltage when high voltage is expected indicating a short to ground at the circuit. | Report malfunction when the engine is running or cranking AND the number of failure events ≥ 3 . A failure event occurs when the number of failed solenoids connected to HSD2 ≥ 2 AND HSD2 voltage < 6V. | No (HSD2) Voltage Low DTC (P2670) this drive cycle. HSD2 Voltage High test (P2671) is running. HSD2 is commanded ON. Components powered and battery voltage between 9V and 18V. If engine is cranking, then crank time < 4 seconds OR battery voltage > 10V. | 75 ms 25 ms | A |
| Actuator Supply 2 (HSD2) Voltage High | P2671 | This test detects if the voltage measured at the HSD 2 detection circuit indicates high during initialization (when the circuit is off) or multiple low side detection circuits indicate open, but the high side detection circuit indicates high voltage. | At initialization, report malfunction when the number of failure events ≥ 3 . A failure event occurs when HSD2 voltage $\geq 6V$. After initialization, report malfunction when the engine is running or cranking AND the number of failure events ≥ 3 . A failure event occurs when the number of failed solenoids connected to HSD2 ≥ 2 AND HSD2 voltage $\geq 6V$. | After initialization . . . No (HSD2) Voltage Low DTC (P2671) this drive cycle. HSD2 Voltage Low test (P2670) is running. HSD2 is commanded ON. Components powered and battery voltage between 9V and 18V. If engine is cranking, then crank time < 4 seconds OR battery voltage > 10V. | 75 ms 25 ms | A |
| TCC Pressure Control Solenoid Control Circuit Open | P2761 | This test detects torque converter solenoid electrical open circuit malfunctions. | Fault pending is set at single hardware fault occurrence. If hardware fault is present for ≥ 120 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and intrusive test indicates no short to ground exists for ≥ 3 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 3075 ms 25 ms | B |
| TCC Pressure Control Solenoid Control Circuit High | P2763 | This test detects solenoid electrical short to power circuit malfunctions. | Short to power is present for ≥ 2 consecutive samples. | No TCC Control Circuit High DTC (P2763) this drive cycle. Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 50 ms 25 ms | B |
| TCC Pressure Control Solenoid Control Circuit Low | P2764 | This test detects solenoid electrical ground circuit malfunctions. | Fault pending is set a single hardware fault occurrence. If the electrical open test is enabled and electrical hardware fault to ground is present of ≥ 120 samples, then initiate intrusive test by opening low side driver. If engine is cranking or running and hardware fault is present for ≥ 2 samples, then report malfunction. | Components powered and battery voltage between 9V and 18V. Associated high side driver enabled and no associated high side driver DTCs. | 3050 ms 25 ms | B |
| Miscellaneous | | | | | | |
| 4 Wheel Drive Low Switch Circuit Malfunction | P2771 | This test detects abnormal conditions for the four-wheel drive indication switch input by comparing switch state range to calculated range. | For Case 1: (Stuck Off) This test fails when, for ≥ 200 occurrences, the transfer case 4WD switch indicates High range and the calculated transfer case range is Low range for ≥ 5 seconds. For Case 2 (Stuck On) This test fails when, for ≥ 200 occurrences, the transfer case 4WD switch indicates Low range and the calculated transfer case range is High range for ≥ 5 seconds. | No Four Wheel Drive Circuit Perf DTC (P2771) for this drive cycle. No Fault Active Four Wheel Drive Circuit Perf DTC (P2771). No Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Fault Pending Output Speed Sensor DTCs (P0721, P0722) for this drive cycle. No Fault Active Output Speed Sensor DTCs (P0721, P0722). Output Speed > 60 RPM Transfer Case NOT neutral 20 deg. C < Transmission fluid temperature < 130 deg. C 200 RPM < Engine Speed < 7500 RPM Shift complete and range attained not neutral | 9 sec 25 ms | B |

08 GRP01 All Transmissions

| SENSED PARAMETER | FAULT CODE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA AND THRESHOLD VALUE(S) | SECONDARY PARAMETERS AND ENABLE CONDITIONS | TIME/FREQ | MIL TYPE |
|--|------------|---|---|---|---|----------|
| GMLAN Bus Reset Counter Overrun | U0073 | This test detects if the GMLAN bus is off for a calibration duration. | CANB_bus is off >= 3 seconds. | Components powered and 9 V < Battery Voltage < 18 V 200 RPM < Engine Speed < 7500 RPM for 5 seconds | 3 sec 100 ms | B |
| GMLAN ECM Controller State of Health Failure | U0100 | This test detects CAN (GMLAN) bus failures by detecting State of Health failures in GMLAN message \$191 from ECM. | Case 1 (x out of y): The failure counter increments when a State of Health (SOH) failure is detected. A SOH failure occurs when message is missing. When the failure counter is >= 5 out of 7 samples, report fail. Case 2 (intermittent): When the failure counter is > 0 and < 5 out of 7 samples for 5 consecutive sample windows, report fail. | Components powered and 9 V < Battery Voltage < 18 V 200 RPM < Engine Speed < 7500 RPM for 5 seconds Ignition Key State = RUN GMLAN message \$191 is received from ECM Enable criteria met for > 3 seconds | For Case 1: 700 ms For Case 2: 3.5 seconds 100 ms | B |
| Upshift Switch Circuit | P0815 | This test detects the upshift switch ON. | Case 1 (PRNDL state is N, P or R): PRNDL state is unchanged for >= 2.5 seconds AND upshift switch state is ON for >= 15 seconds. Case 2 (PRNDL state is forward range): PRNDL state is unchanged for >= 2.5 seconds AND upshift switch state is ON for >= 600 seconds. | No Up_Down_Shift_Switch DTC (P0826) for this drive cycle. No Range_Switch_Illegal_Range DTC (P0708) for this drive cycle. Components powered and 9 V < Ignition Voltage < 18 V 200 RPM < Engine Speed < 7500 RPM for 5 seconds | Case 1: 17.5 seconds Case 2: 602.5 seconds 100 ms | C |
| Downshift Switch Circuit | P0816 | This test detects the downshift switch ON. | Case 1 (PRNDL state is N, P or R): PRNDL state is unchanged for >= 2.5 seconds AND downshift switch state is ON for >= 15 seconds. Case 2 (PRNDL state is forward range): PRNDL state is unchanged for >= 2.5 seconds AND downshift switch state is ON for >= 600 seconds. | No Up_Down_Shift_Switch DTC (P0826) for this drive cycle. No Range_Switch_Illegal_Range DTC (P0708) for this drive cycle. Components powered and 9 V < Ignition Voltage < 18 V 200 RPM < Engine Speed < 7500 RPM for 5 seconds | Case 1: 17.5 seconds Case 2: 602.5 seconds 100 ms | C |
| Up and Down Shift Switch Circuit | P0826 | This test detects upshift/downshift switch circuit at an illegal state. | Switch state is ILLEGAL for >= 10 seconds. | No Up_Down_Shift_Switch DTC (P0826) for this drive cycle. Components powered and 9 V < Ignition Voltage < 18 V 200 RPM < Engine Speed < 7500 RPM for 5 seconds | 10 seconds 100 ms | C |