

08 GRP02 All Transmissions

| SENSED PARAMETER | FAULT CODE | ACCEPTABLE OPERATING RANGE AND RATIONALITY | PRIMARY MALF DETECTION PARAMETERS | SECONDARY MONITORING PARAMETERS AND CONDITIONS | FAIL MONITORING TIME LENGTH AND FREQUENCY OF CHECK | FAULT CODE STORAGE AND MIL ILLUMINATION |
|---|--------------|--|--|---|---|---|
| Throttle Position Signal No Valid Signal CAN | P0120 | This DTC detects an invalid throttle position value from the ECU to the TCM | ECU CAN message does not contain a valid throttle position value for 2.0 seconds | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No CAN error in process | Continuous | DTC Type B |
| TCM ROM Test | P0601 | This DTC detects an error in the flash memory containing the program and calibration | Checksum calculation algorithm of flash memory | none | immediate | DTC Type A |
| No Start Calibration | P0602 | This DTC indicates the flash memory has not been programmed | KbINFD_NoStartCal = TRUE | none | immediate | DTC Type A |
| Power up copy of NVM to RAM | P0603 | This DTC detects an error in the RAM copy of NVM @ power up | Checksum calculation algorithm of NVM copy | none | immediate | DTC Type A |
| RAM Test | P0604 | This DTC tests the read/write capability of each RAM location | Read and write each RAM location | none | immediate | DTC Type A |
| Power down copy of RAM to NVM | P062F | This DTC detects an error in the RAM copy to NVM @ power down | Checksum calculation algorithm RAM to NVM copy | None | immediate | DTC Type A |
| Trans Fluid Temp Sensor Circuit Range/ Performance | P0711 | The DTC detects the following failure modes of the transmission fluid temperature sensor: 1) A sensor that remains at a constant value 2) A sensor that remains at a value 4) Transmission fluid temperature remains below 20° C for a calibrated time as a function of startup transmission fluid temperature. | Fail Case 1 vehicle speed >= 8 KPH for time >= 300 seconds cumulative, TCC slip > 120 RPM for time >= 300 seconds cumulative, -40.0 <= TFT <= 21.0 DegC, engine coolant temperature >= 70.0 DegC, engine coolant temperature delta from start up >= 55.0 DegC Fail Case 2 vehicle speed >= 8 KPH for time >= 300 seconds cumulative, TCC slip > 120 RPM for time >= 300 seconds cumulative, 129 DegC <= TFT <= 150 DegC, engine coolant temperature >= 70.0 DegC, engine coolant temperature delta from start up >= 55.0 DegC, TFT delta < 2.0 DegC for time >= 100 seconds Fail Case 3 TFT Δ >= 20 DegC, Delta occurs 14 times over a 7 second sample period Fail Case 4 TFT Δ ≤ 20° C after a calibrated amount of time based on a 2D lookup table. | <u>For fail case 1, 2, and 4:</u> P0711, P0716, P0717, P0722, P0723 not FA or TFTKO, engine coolant temperature valid, ignition voltage enable, engine speed enable, P0711 not TPTKO, -39 <= TCM internal temperature <= 149 DegC <u>Fail case 1:</u> -40 deg C <= trans fluid temp <= +20 C at startup, Engine coolant => 70 deg C, Engine Coolant has changed => 50 deg C since startup, Vehicle speed since startup => 8 KPH for time => 900 seconds (cumulative timer) <u>Fail case 2:</u> +129 deg C <= trans fluid temp <= +149 C at startup, Engine coolant => 70 deg C, Engine Coolant has changed => 50 deg C since startup, Vehicle speed since startup => 8 KPH for time => 600 seconds (cumulative timer) <u>Fail case 3:</u> System Voltage is between 8 – 18 Volts. Engine Speed 450-7500 for 5 seconds. <u>Fail case 4:</u> Acceleration position valid, engine torque accurate, engine speed accurate, ECT accurate, No soft landing default action present, No immediate landing default action present, 50<=engine torque<= 1492Nm, 8 <= TPS <= 100%, 511 kph>=vehicle speed>= 8 kph, 6800>= engine speed >= 500 RPM, 149 DegC>=Coolant>=39 DegC | <u>Fail case 1:</u> Time => 100.0 seconds Continuous <u>Fail case 2:</u> Time => 100.0 seconds Continuous <u>Fail case 3:</u> Time => 7.0 seconds 14 counts | DTC Special Type C |
| Trans Fluid Temp Sensor Circuit Low input (high temp) | P0712 | 0 to 97 Kohms The DTC detects a continuous short to ground in the TTS signal circuit or the TTS sensor | Resistance ≤ 46.18 Ohms | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds | 10 seconds Continuous | DTC Special Type C |

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|--|--------------|--|---|--|--|---|
| Trans Fluid Temp. Sensor Circuit High input (low temp) | P0713 | 0 to 97 Kohms The DTC detects a continuous open or short to high in the TTS signal circuit or the TTS sensor | Resistance \geq 111.605 k Ohms | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No TISS P0716, P0717, or TOSS P0722, P0723 DTC's - TOSS \geq 200 RPM for at least 200 seconds cumulative - Trans slip speed \geq 120 RPM for at least 200 seconds cumulative | 25 seconds Continuous | DTC Special Type C |
| Transmission Input Speed Sensor performance, signal drop | P0716 | 0 RPM to 6800 RPM This DTC detects an unrealistic large drop in transmission input speed. | Trans input speed delta \geq 1000 RPM during sample period | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No throttle system P1791, P1795 DTC's - No TISS P0716 FA or TFTKO - No TISS P0717 DTC - No TOSS P0722, P0723 DTC's - No shift solenoid A performance DTC P0752 - No shift solenoid A electrical DTC's P1842 or P1843 - No Engine Torque DTC's - Vehicle speed \geq 16 KPH - TPS \geq 12 % - Trans input speed > 1050 RPM for time \geq 2 seconds - Positive trans input speed delta \geq 500 RPM for time \geq 2 seconds OR - Negative trans input speed delta for a time \geq 2 seconds | 4 second sample period | DTC Type B |
| Transmission Input Speed Sensor Low input, no activity | P0717 | 0 RPM to 6800 RPM This DTC detects a low transmission input speed when the vehicle is moving in a drive gear range. | Trans input speed < 100 RPM over sample period | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No Engine Torque DTC's - No TOSS P0722, P0723 DTC's - Vehicle speed \geq 16 KPH - No TISS 717 FA or TFTKO | 5 second sample period Continuous | DTC Type B |
| Vehicle Speed Sensor Low input | P0722 | 0 RPM to 6800 RPM This DTC detects a low vehicle speed when the vehicle has a large engine speed in a drive gear range. | Transmission output speed \leq 100 RPM | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No engine torque default - No TISS P0716 or P0717 DTC's - No TPS DTC's - No P0723 DTC - P0722 not FA or TFTKO - Engine Torque: 70 to 450 Nm - Throttle position \geq 12% - TISS: 1500 to 6800 RPM | 3 seconds Continuous | DTC Type B |
| Vehicle Speed Sensor Intermittent | P0723 | 0 RPM to 6800 RPM This DTC detects an unrealistic large drop in vehicle speed. | Transmission output speed drop \geq 1300 RPM during sample period | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No TISS P0716, P0717 DTC's - No shift solenoid A electrical DTC P1843 - Trans input speed change between samples \leq 500 RPM for time \geq 2 seconds - Trans output speed > 1400 RPM for a time \geq 2 seconds - Positive trans output speed delta \leq 500 RPM for a time \geq 2 seconds OR - Negative trans output speed delta for a time \geq 2 seconds | 3 second sample period | DTC Type B |

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|------------------------------|--------------|---|--|---|--|---|
| TCC System Stuck OFF | P0741 | This DTC detects high torque converter slip when the TCC is commanded on. | <p><u>Increment fail counter when:</u></p> <p>TCC slip \geq f(engine torque) for time \geq 8 seconds, where f(engine torque) is 150 to 250 RPM</p> <p>Fail counter \geq 2</p> | <ul style="list-style-type: none"> - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No IMS range DTC's - No throttle system P1791, P1795 DTC's - No engine torque default - No TISS P0716, P0717 DTC's - No TOSS P0722, P0723 DTC's - IMS range is D2, D3, D4 or D5 - No TCC solenoid electrical P1866, P1867 DTC's - No TCC stuck ON P0742 TCC DTC set - No IMS range change in last 6 seconds - TPS: 10% to 90% - Trans temp.: 20 C to 130 C - Engine torque: 55 Nm to 450 Nm - 3rd gear ratio: 1.56 to 1.64 or - 4th gear ratio: 0.98 to 1.03 or - 5th gear ratio: 0.73 to 0.77 - TCC LOCKED or ON - TCC commanded pressure \geq 200 kPa for time \geq 2 seconds - TCC duty cycle \geq 80% for time \geq 2 seconds | Run fail only once per TCC ON cycle, at a max rate of 100 mS. | DTC Type B |
| TCC System Stuck ON | P0742 | This DTC detects low torque converter slip when the TCC is commanded off. | <p><u>Increment fail counter when:</u></p> <p>TCC Slip: -20 to +20 RPM for time \geq 3.5 seconds</p> <p>Fail Counter \geq 3</p> | <ul style="list-style-type: none"> - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No IMS range DTC's - No throttle system P1791, P1795 DTC's - No engine torque default - No TISS P0716, P0717 DTC's - No TOSS P0722, P0723 DTC's - IMS range is D5 - No TCC solenoid electrical P1866, P1867 DTC's - No TCC stuck OFF P0741 TCC DTC set - Not in 1st gear - Trans temp: 20 C to 130 C - Engine torque: 80 Nm to 450 Nm - Throttle position: 12% to 90% - Engine speed: 500 to 6800 RPM - Vehicle speed \geq 15 KPH - Gear ratio: 0.73 to 2.27 - TCC is commanded OFF | 100 mS continuous | DTC Type B |
| Shift Solenoid A Performance | P0751 | This DTC detects abnormal shift pattern Stuck ON: 2-2-3-3 pattern | <p>The fail counter is incremented when the following fail cases are true:</p> <p>Stuck ON fail case 1 AND fail case 2</p> <p>Fail Counter \geq 2</p> | <p>General</p> <ul style="list-style-type: none"> - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No TPS DTC's - No IMS range DTC's - No engine torque default - No shift solenoid electrical DTC's: P0973, P0974, P0976, P0977, P0979, P0980 - No TCC stuck ON DTC P0742 - No TISS P0716, P0717 DTC's - No TOSS P0722, P0723 DTC's - IMS range not park or neutral or reverse - Trans temp: 20 C to 130 C - Trans input speed: 200 to 6800 RPM - Trans output speed \geq 100 RPM <p>Fail Case 1</p> <ul style="list-style-type: none"> - 1st gear commanded for time \geq 1.25 second - TPS \geq 10% - Engine torque: 40 Nm to 450 Nm - Gear ratio: 2.16 to 2.27 <p>Fail Case 2</p> <ul style="list-style-type: none"> - 4th or 5th gear commanded for time \geq 5.0 second - TPS \geq 10% - Engine torque: 36 Nm to 450 Nm - Gear ratio: 1.56 to 1.64 | <p>Continuous</p> <p>Fail Case 1 1.25 seconds</p> <p>Fail Case 2 5 seconds</p> | DTC Type B |

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| Shift Solenoid C Performance | P0762 | This DTC detects abnormal shift pattern Stuck ON: 1-2-3-4-4 pattern | The fail counter is incremented when the following fail cases are true: Stuck ON fail case 10 Fail Counter ≥ 2 | General - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No TPS DTC's - No IMS range DTC's - No engine torque default - - No shift solenoid electrical DTC's: P0973, P0974, P0976, P0977, P0979, P0980 - No TCC stuck ON DTC P0742 - No TISS P0716, P0717 DTC's - No TOSS P0722, P0723 DTC's - IMS range not park or neutral or reverse - Trans temp: 20 C to 130 C - Trans input speed: 200 to 6800 RPM - Trans output speed ≥ 100 RPM Fail Case 10 - 5th gear commanded for time ≥ 1.0 second - TPS ≥10% - Engine torque: 36 Nm to 450 Nm - Gear ratio: 0.98 to 1.03 Fail Case 11 - 2nd or 3rd gear commanded for time ≥ 3.0 seconds | Continuous Fail Case 10 3.5 seconds Fail Case 11 3.0 seconds | DTC Type B |
| Shift Solenoid A Electrical (open or ground short) | P0973 | 0V to 12V This DTC detects a continuous short to ground or open on shift solenoid A circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and an open is detected by hardware OR Shift solenoid is commanded off and a short to ground is detected by hardware | Continuous | DTC Type B |
| Shift Solenoid A Electrical (power short) | P0974 | 0V to 12V This DTC detects a continuous short to voltage on shift solenoid A circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and a short to voltage is detected by hardware | Continuous | DTC Type B |
| Shift Solenoid B Electrical (open or ground short) | P0976 | 0V to 12V This DTC detects a continuous short to ground or open on shift solenoid B circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and an open is detected by hardware OR Shift solenoid is commanded off and a short to ground is detected by hardware | Continuous | DTC Type B |
| Shift Solenoid B Electrical (power short) | P0977 | 0V to 12V This DTC detects a continuous short to voltage on shift solenoid B circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and a short to voltage is detected by hardware | Continuous | DTC Type B |
| Shift Solenoid C Electrical (open or ground short) | P0979 | 0V to 12V This DTC detects a continuous short to ground or open on shift solenoid C circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and an open is detected by hardware OR Shift solenoid is commanded off and a short to ground is detected by hardware | Continuous | DTC Type B |

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|---|--------------|--|--|--|--|---|
| Shift Solenoid C Electrical (power short) | P0980 | 0V to 12V This DTC detects a continuous short to voltage on shift solenoid C circuit | Fail counter ≥ 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Shift solenoid is commanded on and a short to voltage is detected by hardware | Continuous | DTC Type B |
| IMS Circuit A Low | P1820 | 0V to 12V This DTC detects an IMS circuit A ground short. | IMS Circuit A open flag is not set, increment fail counter. | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No engine torque default - Engine torque: 55 to 450 Nm - IMS range is Park for time ≥ 1.0 seconds - A transitional IMS state is present for time ≥ 4.0 seconds | Fail Counter ≥ 1 | DTC Type B |
| IMS Circuit B High | P1822 | 0V to 12V This DTC detects an IMS circuit B power short. | IMS Circuit B open flag is set, increment fail counter. | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No engine torque default - Engine torque: 55 Nm to 450 Nm - IMS range is Park for time ≥ 1.0 seconds - A transitional IMS state is present for time ≥ 4.0 seconds | Fail Counter ≥ 1 | DTC Type B |
| IMS Circuit P Low | P1823 | 0V to 12V This DTC detects an IMS circuit P ground short. | IMS Circuit P open flag is not set, increment fail counter. | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No engine torque default - Engine torque: 25 Nm to 450 Nm - IMS range is Park for time ≥ 1.0 seconds - A transitional IMS state is present for time ≥ 5.0 seconds | Fail Counter ≥ 1 | DTC Type B |
| IMS Illegal Range | P1825 | 0V to 12V This DTC detects an IMS "illegal" range value. | IMS range value converted is not a valid value. | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds | 5.0 seconds Continuous | DTC Type B |
| IMS Circuit C High | P1826 | 0V to 12V This DTC detects an IMS circuit C power short. | IMS Circuit C open flag is set, increment fail counter. | - Ignition voltage: 8 V to 18 V - No TOSS DTC's - No engine torque default - Engine torque ≥ 20 Nm - Vehicle speed ≥ 8.0 KHP - Gear ratio: 3.33 to 3.50 (1 st) OR 2.16 to 2.27 (2 nd) OR 1.56 to 1.64 (3 rd) OR 0.98 to 1.03 (4 th) OR 0.73 to 0.77 (5 th) - P1826 not passed this ignition cycle | 3.0 seconds Fail Counter ≥ 1 | DTC Type B |
| High Side Driver 2 Ground Short | P1833 | 0V to 12V This DTC detects a continuous short to ground on the high side driver circuit | Fail counter ≥ 21 counts out of 25 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on and ground short is detected by hardware | Continuous | DTC Type B |
| High Side Driver 2 Power Short | P1834 | 0V to 12V This DTC detects a continuous short to power on the high side driver circuit | immediate | - TCM powered - Hardware monitor detects voltage ≥ 6.4 V on high side driver 2 circuit | Continuous | DTC Type B |
| IMS Start in Wrong Range | P1915 | 0V to 12V This DTC detects an invalid state of the IMS during engine start up. | IMS position remains in a transitional state during the sequential period of the test. | - Run once per ignition cycle - Ignition voltage: 6 V to 18 V - No TOSS P0722, P0723 DTC's - Trans output speed ≤ 100 RPM - Engine speed ≤ 60 RPM for time ≥ 0.25 seconds - Sequentially: Engine speed 81 to 625 RPM for time ≥ 0.15 seconds Then Engine speed ≥ 651 RPM and input speed ≥ 200 RPM for time ≥ 1.5 seconds | Once per ignition cycle during engine start up. | DTC Type B |

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|---|--------------|---|---|---|--|---|
| Ignition Run Crank Relay Open Circuit Diagnostic | P2534 | This DTC detects an OPEN or Sort to GND on the Ignition/Run /Crank Input to the TCM | Fail counter \geq 400 counts out of 480 total counts. Note: Every 25 msec, the counters are incremented. | - The ECM sends an Engine is Running Status Message - The TCM is not in Diagnostic Reset | Continuous | DTC Type A |
| Torque Reduction Signal Circuit CAN | P2544 | This DTC detects a failed torque reduction requested by the ECU to the TCM | ECU CAN torque request fail flag is true for 2.0 seconds | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No CAN error in process | Continuous | DTC Type B |
| Engine Torque Signal Circuit No Valid Signal CAN | P2637 | This DTC detects an invalid engine torque value from the ECU to the TCM | ECU CAN message does not contain a valid engine torque value for 2.0 seconds | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - No CAN error in process | Continuous | DTC Type B |
| TCC PWM Solenoid Electrical (power short) | P2763 | 0V to 12V This DTC detects a continuous short to power on TCC PWM circuit | Fail counter \geq 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - TCC duty cycle \geq 45 % AND power short is detected by hardware | Continuous | DTC Type B |
| TCC PWM Solenoid Electrical (open or ground short) | P2764 | 0V to 12V This DTC detects a continuous short to ground or open on TCC PWM circuit | Fail counter \geq 43 counts out of 50 total counts | - Ignition voltage: 8 V to 18 V - Engine speed: 450 to 6800 RPM for at least 5 seconds - High side driver 2 is commanded on - Ground short detection: TCC duty cycle \geq 20 % OR TCC duty cycle \leq 50 % AND ground short is detected by hardware - Open detection: TCC duty cycle \geq 20 % AND open is detected by hardware | Continuous | DTC Type B |
| CAN Bus Short | U0073 | This DTC detects a Short on the CAN Bus | Fail Counter = 5 out of 5 counts. (1 second counts) | - Ignition voltage: 8 V to 18 V | Continuous | DTC Type B |
| CAN Bus Error ECU | U0100 | This DTC detects a communication problem between the TCM and ECU | No valid ECU CAN message for 12.0 seconds | - Ignition voltage: 8 V to 18 V - no ECU engine speed and torque message for time \geq 50 mS AND no ECU throttle position message for time \geq 50 mS AND no ECU general status message for time \geq 12.0 sec AND no ECU engine coolant temp and baro for time \geq 12.0 sec AND no ECU wheel speed for time \geq 50 mS | Continuous | DTC Type B |

P0711 Fail Case 4 Table

| Start-Up Transmission Temperature (DegC) | Time for Transmission Temp to reach 20 DegC (sec) |
|--|---|
| -40 | 1900 |
| -25 | 1000 |
| -10 | 800 |
| -5 | 520 |
| 20 | 200 |