

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions                  | Time<br>Required | Mil<br>Illum.     |
|---|---------------|---|--|--------------------|--|---------------------------------------|------------------|-------------------|
| Transmission<br>Control Module<br>(TCM) | C1251         | The lateral acceleration<br>signal is stuck at a high<br>magnitude in range | Lateral acceleration<br>magnitude                                  | <= 3.8499999 g's   |  |                                       |                  | Special<br>No MIL |
|   |               |   | Lateral acceleration<br>magnitude                                  | >= 0.53 g's        |  |                                       |                  |                   |
|   |               |   | Lateral acceleration<br>magnitude is within<br>the range above for | >= 75 Sec          |  |                                       |                  |                   |
|   |               |   |  |                    | Lateral acceleration<br>magnitude                                  | <= 3.85 g's                           |                  |                   |
|   |               |   |  |                    | Lateral acceleration<br>magnitude                                  | >= 0.53 g's                           |                  |                   |
|   |               |   |  |                    | Lateral acceleration<br>magnitude is within the<br>range above for | >= 60 Sec                             |                  |                   |
|   |               |   |  |                    | Diagnostic shifting<br>override command                            | = FALSE Boolean                       |                  |                   |
|   |               |   |  |                    | Attained Gear State  | = 1st<br>through<br>6th               |                  |                   |
|   |               |   |  |                    | Attained Gear Slip   | <= 100 RPM                            |                  |                   |
|   |               |   |  |                    | Transmission Type  | = Clutch to<br>Clutch<br>Transmission |                  |                   |

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|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|---|------------------|---------------|
|                      |               |                                 |                         |                    | High Side Driver 1 On                                 | = TRUE Boolean  |                  |               |
|                      |               |                                 |                         |                    | Vehicle Speed   | >= 15 kph   |                  |               |
|                      |               |                                 |                         |                    | Battery Voltage                                       | <= 31.99902 Volts   |                  |               |
|                      |               |                                 |                         |                    | Battery Voltage                                       | >= 9 Volts  |                  |               |
|                      |               |                                 |                         |                    | Battery voltage is within<br>the allowable limits for | >= 0.1 Sec  |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage                                      | <= 31.99902 Volts   |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage                                      | >= 9 Volts  |                  |               |
|                      |               |                                 |                         |                    | Service Fast Learn (SFL)<br>Mode                      | = FALSE Boolean   |                  |               |
|                      |               |                                 |                         |                    | Ignition voltage and SFL<br>conditions met for        | >= 0.1 Sec  |                  |               |
|                      |               |                                 |                         |                    | <b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b>    | <b>MIL not Illuminated for<br/>DTC's:</b> TCM: If calibrated to<br>illuminate the MIL (P0716,<br>P0717, P0721, P0722,<br>P0723, P07BF, P07C0,<br>P077B, P077C, P077D,<br>P215C, U0073)<br><br>ECM: None |                  |               |

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|-----------------------------------|---------------|--|---|--------------------|--------------------------------|-------------------------|--|---------------|
| Transmission Control Module (TCM) | P0601         | Transmission Electro-Hydraulic Control Module Read Only Memory       | Incorrect program/calibrations checksum                             | = TRUE Boolean     | MIL not Illuminated for DTC's: | TCM: P0601<br>ECM: None | >= 5 Fail Counts                       | One Trip      |
| Transmission Control Module (TCM) | P0603         | Transmission Electro-Hydraulic Control Module Long-Term Memory Reset | Non-volatile memory (static or dynamic) checksum failure at Powerup | = TRUE Boolean     | MIL not Illuminated for DTC's: | TCM: P0603<br>ECM: None | Runs Continuously                      | One Trip      |
| Transmission Control Module (TCM) | P0604         | Transmission Electro-Hydraulic Control Module Random Access Memory   | RAM Read/Write Failure (Single Word)                                | = TRUE Boolean     | MIL not Illuminated for DTC's: | TCM: P0604<br>ECM: None | >= 5 Fail Counts<br>= 16 Sample Counts | One Trip      |

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| Component/<br>System              | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria                                 | Threshold<br>Value | Secondary<br>Malfunction                              | Enable<br>Conditions    | Time<br>Required     | Mil<br>Illum. |
|-----------------------------------|---------------|---|---|--------------------|---|-------------------------|----------------------|---------------|
| Transmission Control Module (TCM) | P062F         | Transmission Electro-Hydraulic Control Module Long Term Memory Performance  | TCM Non-Volatile Memory bit Incorrect flag at Powerdown | = TRUE Boolean     |   |                         | Runs Continuously    | One Trip      |
|                                   |               |   |   |                    | Disable Conditions:<br>MIL not Illuminated for DTC's: | TCM: P062F<br>ECM: None |                      |               |
| Transmission Control Module (TCM) | P0634         | Transmission Electro-Hydraulic Control Module Internal Temperature Too High | Fail Case 1 Substrate Temperature                       | >= 142.10156 °C    |   |                         | >= 5 Fail Time (Sec) | One Trip      |
|                                   |               |   | Fail Case 2 Substrate Temperature                       | >= 50 °C           |   |                         | >= 2 Fail Time (Sec) |               |
|                                   |               |   | Ignition Voltage  | >= 18 Volts        |   |                         |                      |               |
|                                   |               |   | Note: either fail case can set the DTC                  |                    |   |                         |                      |               |
|                                   |               |   |   |                    | Ignition Voltage Lo                                   | >= 8.599609 Volts       |                      |               |
|                                   |               |   |   |                    | Ignition Voltage Hi                                   | <= 31.99902 Volts       |                      |               |
|                                   |               |   |   |                    | Substrate Temp Lo                                     | >= 0 °C                 |                      |               |
|                                   |               |   |   |                    | Substrate Temp Hi                                     | <= 170 °C               |                      |               |
|                                   |               |   |   |                    | Substrate Temp Between Temp Range for Time            | >= 0.25 Sec             |                      |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description     | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction                              | Enable<br>Conditions                            | Time<br>Required                               | Mil<br>Illum. |
|----------------------|---------------|-------------------------------------|--|--------------------|---|---|--|---------------|
|                      |               |                                     |  |                    | P0634 Status is                                       | ≠<br>Test Failed<br>This Key On or Fault Active |  |               |
|                      |               |                                     |  |                    | Disable Conditions:<br>MIL not Illuminated for DTC's: | TCM: None<br>ECM: None                          |  |               |
| High Side Driver 1   | P0658         | Actuator Supply Voltage Circuit Low | The HWIO reports a low voltage (open or ground short) error flag | = TRUE Boolean     |   |   | >= 4 Fail Counts<br><br>out of 6 Sample Counts | One Trip      |
|                      |               |                                     |  |                    | P0658 Status is not                                   | =<br>Test Failed<br>This Key On or Fault Active |  |               |
|                      |               |                                     |  |                    | High Side Driver 1 On                                 | = True Boolean                                  |  |               |

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| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction        | Enable<br>Conditions  | Time<br>Required                  | Mil<br>Illum. |
|---|---------------|---|---|--|---------------------------------|---|-----------------------------------|---------------|
|   |               |   |   |  | Disable<br>Condi-<br>tion<br>s: | MIL not Illuminated for<br>DTC's:<br>TCM: None<br>ECM: None |                                   |               |
| Transmission<br>Control Module<br>(TCM) | P0667         | TCM Internal Temp<br>(substrate) Sensor<br>Circuit<br>Range/Performance | If transmission oil<br>temp to substrate<br>temp Δ                | ><br>Refer to<br>Table 19 in °C<br>supporting<br>documents |                                 |   |                                   | Two<br>Trips  |
|   |               |   | If TCM substrate<br>temp to power up<br>temp Δ                    | ><br>Refer to<br>Table 20 in °C<br>supporting<br>documents |                                 |   | Fail<br>Counts<br>(100ms<br>loop) |               |
|   |               |   | Both conditions<br>above required to<br>increment fail<br>counter |  |                                 |   | ≥ 3000                            |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--|--|--|---------------|
|                      |               |                                 | <p>Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.</p> |                    |  |  | <p>Out of 3750 Sample Counts (100ms loop)</p>  |               |
|                      |               |                                 | <p>Non-continuous (intermittent) fail conditions will delay resetting fail counter until</p>                |                    |  |  | <p>&gt;= 700 Pass Counts (100ms loop)</p> <p>Out of 875 Sample Counts (100ms loop)</p> |               |
|                      |               |                                 |   |                    | <p>Engine Torque Signal Valid</p> <p>Accelerator Position Signal Valid</p> <p>Ignition Voltage Lo</p> <p>Ignition Voltage Hi</p> <p>Engine Speed Lo</p> <p>Engine Speed Hi</p> <p>Engine Speed is within the allowable limits for</p> <p>Brake torque active</p> | <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>&gt;= 8.599609 Volts</p> <p>&lt;= 31.99902 Volts</p> <p>&gt;= 400 RPM</p> <p>&lt;= 7500 RPM</p> <p>&gt;= 5 Sec</p> <p>= FALSE</p> |  |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Below describes the brake torque entry criteria<br><br>Engine Torque >= 90 N*m<br>Throttle >= 30.00031 Pct<br><br>Transmission Input Speed <= 200 RPM<br>Vehicle Speed <= 8 Kph<br>Transmission Range ≠ Park<br>Transmission Range ≠ Neutral<br>PTO = Not Active<br>Set Brake Torque Active TRUE if above conditions are met for: >= 7 sec |                      |                  |               |
|                      |               |                                 |                         |                    | Below describes the brake torque exit criteria<br><br>Brake torque entry criteria = Not Met<br><br>Clutch hydraulic pressure ≠ Clutch Hydraulic Air Purge Event<br><br>Clutch used to exit brake torque active = CeTFTD_e_C3_Rat IEnbl   |                      |                  |               |



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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value  | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|---|---|--|------------------|---------------|
|                      |               |                                 |                         |   | <p>The above clutch pressure is greater than this value for one loop</p> <p>Set Brake Torque Active FALSE if above conditions are met for:</p> <p>P0667 Status is</p> | <p>&gt;= 600 kpa</p> <p>&gt;= 20 Sec</p> <p>≠ This Key On or Fault Active</p>  |                  |               |
|                      |               |                                 |                         | <p><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b></p> | <p><b>MIL not Illuminated for DTC's:</b></p>  | <p>TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730</p> <p>ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E</p> |                  |               |

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| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria  | Threshold<br>Value                 | Secondary<br>Malfunction                           | Enable<br>Conditions                                     | Time<br>Required          | Mil<br>Illum. |  |
|---|---------------|--|--|------------------------------------|--|--|---------------------------|---------------|--|
| Transmission<br>Control Module<br>(TCM) | P0668         | TCM internal<br>temperature (substrate)<br>thermistor failed at a<br>low voltage | Type of Sensor<br>Used =   | CeTFTI_e_<br>VoltageDir<br>ectProp |  |  |                           | Two<br>Trips  |  |
|   |               |  | If TCM Substrate<br>Temperature<br>Sensor = Direct<br>Proportional and<br>Temp   | <=                                 | -249 °C  |  |                           |               |  |
|   |               |  | If TCM Substrate<br>Temperature<br>Sensor = Indirect<br>Proportional and<br>Temp | >=                                 | -249 °C  |  |                           |               |  |
|   |               |  | Either condition<br>above will satisfy<br>the fail conditions                    |                                    |  |  | >= 60 Fail Timer<br>(Sec) |               |  |
|   |               |  |  |                                    | Ignition Voltage Lo                                | >= 8.599609 Volts  |                           |               |  |
|   |               |  |  |                                    | Ignition Voltage Hi                                | <= 31.99902 Volts  |                           |               |  |
|   |               |  |  |                                    | Engine Speed Lo                                    | >= 400 RPM   |                           |               |  |
|   |               |  |  |                                    | Engine Speed Hi                                    | <= 7500 RPM  |                           |               |  |
|   |               |  |  |                                    | Engine Speed is within the<br>allowable limits for | >= 5 Sec   |                           |               |  |
|   |               |  |  |                                    | P0668 Status is                                    | ≠ Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                           |               |  |

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| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction                           | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum.       |              |
|---|---------------|---|--|--------------------|--|---|------------------|---------------------|--------------|
|   |               |   |  |                    | Disable<br>Condition<br>s:                         | MIL not Illuminated for<br>DTC's:<br>TCM: None<br>ECM: None |                  |                     |              |
| Transmission<br>Control Module<br>(TCM) | P0669         | TCM internal<br>temperature (substrate)<br>thermistor failed at a<br>high voltage | Type of Sensor<br>Used   | =                  | CeTFTI_e_<br>VoltageDir<br>ectProp                 |   |                  |                     | Two<br>Trips |
|   |               |   | If TCM Substrate<br>Temperature<br>Sensor = Direct<br>Proportional and<br>Temp   | >=                 | 249 °C   |   |                  |                     |              |
|   |               |   | If TCM Substrate<br>Temperature<br>Sensor = Indirect<br>Proportional and<br>Temp | <=                 | 249 °C   |   |                  |                     |              |
|   |               |   | Either condition<br>above will satisfy<br>the fail conditions                    |                    |  |   | >= 60            | Fail Timer<br>(Sec) |              |
|   |               |   |  |                    | Ignition Voltage Lo                                | >= 8.599609 Volts   |                  |                     |              |
|   |               |   |  |                    | Ignition Voltage Hi                                | <= 31.99902 Volts   |                  |                     |              |
|   |               |   |  |                    | Engine Speed Lo                                    | >= 400 RPM  |                  |                     |              |
|   |               |   |  |                    | Engine Speed Hi                                    | <= 7500 RPM   |                  |                     |              |
|   |               |   |  |                    | Engine Speed is within the<br>allowable limits for | >= 5 Sec  |                  |                     |              |

| Component/<br>System              | Fault<br>Code | Monitor Strategy<br>Description                    | Malfunction<br>Criteria                  | Threshold<br>Value                             | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|-----------------------------------|---------------|--|--|--|--|--|------------------|---------------|
|                                   |               |  |  |  | <p>P0669 Status is</p> <p>For Hybrids, below conditions must also be met</p> <p>Estimated Motor Power Loss</p> <p>Estimated Motor Power Loss greater than limit for time</p> <p>Lost Communication with Hybrid Processor Control Module</p> <p>Estimated Motor Power Loss Fault</p> <p><b>Disable Condition s:</b></p> | <p>Test Failed This Key On or Fault Active</p> <p>≠</p> <p>≥ 0 kW</p> <p>≥ 0 Sec</p> <p>= FALSE</p> <p>= FALSE</p> <p>TCM: P0716, P0717, P0722, P0723</p> <p>ECM: None</p> |                  |               |
| Transmission Control Module (TCM) | P06AC         | TCM Power-up Temp Sensor Circuit Range/Performance | If TCM power-up temp to substrate temp Δ | > Refer to Table 20 in supporting documents °C |  |  |                  | Two Trips     |

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|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|--|---------------|
|                      |               |                                 | If transmission oil temp to power up temp $\Delta$   | > Refer to Table 18 in supporting documents °C |                          |                      |  |               |
|                      |               |                                 | Both conditions above required to increment fail counter<br><br>Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp. |  |                          |                      | >= 3000 Fail Counts (100ms loop)<br><br>Out of 3750 Sample Counts (100ms loop) |               |
|                      |               |                                 | Non-continuous (intermittent) fail conditions will delay resetting fail counter until  |  |                          |                      | >= 700 Pass Counts (100ms loop)<br><br>Out of 875 Sample Counts (100ms loop)   |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                                      | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Torque Signal Valid                                    | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Accelerator Position Signal Valid                             | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo   | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi   | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo   | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi   | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for               | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Brake torque active   | = FALSE              |                  |               |
|                      |               |                                 |                         |                    | Below describes the brake torque entry criteria               |                      |                  |               |
|                      |               |                                 |                         |                    | Engine Torque   | >= 90 N*m            |                  |               |
|                      |               |                                 |                         |                    | Throttle  | >= 30.00031 Pct      |                  |               |
|                      |               |                                 |                         |                    | Transmission Input Speed                                      | <= 200 RPM           |                  |               |
|                      |               |                                 |                         |                    | Vehicle Speed   | <= 8 Kph             |                  |               |
|                      |               |                                 |                         |                    | Transmission Range  | ≠ Park               |                  |               |
|                      |               |                                 |                         |                    | Transmission Range  | ≠ Neutral            |                  |               |
|                      |               |                                 |                         |                    | PTO   | = Not Active         |                  |               |
|                      |               |                                 |                         |                    | Set Brake Torque Active TRUE if above conditions are met for: | >= 7 sec             |                  |               |

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|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|---|------------------|---------------|
|                      |               |                                 |                         |                    | Below describes the brake torque exit criteria                    |   |                  |               |
|                      |               |                                 |                         |                    | Brake torque entry criteria                                       | = Not Met                                 |                  |               |
|                      |               |                                 |                         |                    | Clutch hydraulic pressure   | ≠ Clutch Hydraulic Air Purge Event        |                  |               |
|                      |               |                                 |                         |                    | Clutch used to exit brake torque active                           | = CeTFTD_e_C3_Rat IEnbl                   |                  |               |
|                      |               |                                 |                         |                    | The above clutch pressure is greater than this value for one loop | >= 600 kpa                                |                  |               |
|                      |               |                                 |                         |                    | Set Brake Torque Active FALSE if above conditions are met for:    | >= 20 Sec                                 |                  |               |
|                      |               |                                 |                         |                    | P06AC Status is   | ≠ Test Failed This Key On or Fault Active |                  |               |

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|---|---------------|---|-------------------------|--------------------|---|---|--------------------------|---------------|---------------------|-------------------|-----------------|------------|
|   |               |   |                         |                    | Disable<br>Condition<br>s:<br><br>MIL not illuminated for<br>DTC's: | TCM: P0658, P0668,<br>P0669, P06AD, P06AE,<br>P0716, P0712, P0713,<br>P0717, P0722, P0723,<br>P0962, P0963, P0966,<br>P0967, P0970, P0971,<br>P215C, P2720, P2721,<br>P2729, P2730<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                          |               |                     |                   |                 |            |
| Transmission<br>Control Module<br>(TCM) | P06AD         | TCM power-up<br>thermistor circuit<br>voltage low | Power Up Temp           | <= -59 °C          |   |   | >= 60 Fail Time<br>(Sec) | Two<br>Trips  |                     |                   |                 |            |
|   |               |   |                         |                    | Ignition Voltage Lo   | >= 8.599609 Volts   |                          |               | Ignition Voltage Hi | <= 31.99902 Volts | Engine Speed Lo | >= 400 RPM |



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| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description                    | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required        | Mil<br>Illum. |
|---|---------------|--|-------------------------|--------------------|--|---|-------------------------|---------------|
|   |               |  |                         |                    | P06AD Status is<br><br>For Hybrids, below<br>conditions must also be<br>met<br><br>Estimated Motor Power<br>Loss<br><br>Estimated Motor Power<br>Loss greater than limit for<br>time<br><br>Lost Communication with<br>Hybrid Processor Control<br>Module<br><br>Estimated Motor Power<br>Loss Fault<br><br><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b> | Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active<br><br>≠<br><br>≥ 0 kW<br><br>≥ 0 Sec<br><br>= FALSE<br><br>= FALSE<br><br>TCM: P0716, P0717,<br>P0722, P0723<br><br>ECM: None |                         |               |
| Transmission<br>Control Module<br>(TCM) | P06AE         | TCM power-up<br>thermistor circuit<br>voltage high | Power Up Temp           | ≥ 164 °C           |  |   | ≥ 60 Fail Time<br>(Sec) | Two<br>Trips  |
|   |               |  |                         |                    | Ignition Voltage Lo  | ≥ 8.599609 Volts  |                         |               |

| Component/<br>System                        | Fault<br>Code | Monitor Strategy<br>Description                   | Malfunction<br>Criteria                      | Threshold<br>Value                             | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|---|---------------|---|--|--|--|---|------------------|---------------|
|   |               |   |  |  | Ignition Voltage Hi<br>Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br>P06AE Status is<br><br>MIL not illuminated for<br>DTC's: | <= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>Test Failed This Key On or Fault Active<br><br>TCM: None<br>ECM: None |                  |               |
| Transmission Fluid Temperature Sensor (TFT) | P0711         | Trans Fluid Temp Sensor Circuit Range/Performance | If transmission oil temp to substrate temp Δ | > Refer to Table 19 in supporting documents °C |  |   |                  | Two Trips     |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value                             | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|----------------------------|----------------------|--|---------------|
|                      |               |                                 | If transmission oil temp to power up temp $\Delta$   | > Refer to Table 18 in supporting documents °C |                            |                      |  |               |
|                      |               |                                 | Both conditions above required to increment fail counter<br><br>Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp. |  |                            |                      | >= 3000 Fail Counts (100ms loop)<br><br>Out of 3750 Sample Counts (100ms loop) |               |
|                      |               |                                 | Non-continuous (intermittent) fail conditions will delay resetting fail counter until  |  |                            |                      | >= 700 Pass Counts (100ms loop)<br><br>Out of 875 Sample Counts (100ms loop)   |               |
|                      |               |                                 |  |  | Engine Torque Signal Valid | = TRUE Boolean       |  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Accelerator Position<br>Signal Valid                                | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo   | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi   | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo   | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi   | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the<br>allowable limits for                  | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Brake torque active   | = FALSE              |                  |               |
|                      |               |                                 |                         |                    | Below describes the brake<br>torque entry criteria                  |                      |                  |               |
|                      |               |                                 |                         |                    | Engine Torque   | >= 90 N*m            |                  |               |
|                      |               |                                 |                         |                    | Throttle  | >= 30.00031 Pct      |                  |               |
|                      |               |                                 |                         |                    | Transmission Input Speed  | <= 200 RPM           |                  |               |
|                      |               |                                 |                         |                    | Vehicle Speed   | <= 8 Kph             |                  |               |
|                      |               |                                 |                         |                    | Transmission Range  | ≠ Park               |                  |               |
|                      |               |                                 |                         |                    | Transmission Range  | ≠ Neutral            |                  |               |
|                      |               |                                 |                         |                    | PTO   | = Not<br>Active      |                  |               |
|                      |               |                                 |                         |                    | Set Brake Torque Active<br>TRUE if above conditions<br>are met for: | >= 7 sec             |                  |               |
|                      |               |                                 |                         |                    | Below describes the brake<br>torque exit criteria                   |                      |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions                      | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|---|------------------|---------------|
|                      |               |                                 |                         |                    | Brake torque entry criteria                                       | = Not Met                                 |                  |               |
|                      |               |                                 |                         |                    | Clutch hydraulic pressure   | ≠ Clutch Hydraulic Air Purge Event        |                  |               |
|                      |               |                                 |                         |                    | Clutch used to exit brake torque active                           | = CeTFTD_e_C3_RateIEnbl                   |                  |               |
|                      |               |                                 |                         |                    | The above clutch pressure is greater than this value for one loop | >= 600 kpa                                |                  |               |
|                      |               |                                 |                         |                    | Set Brake Torque Active FALSE if above conditions are met for:    | >= 20 Sec                                 |                  |               |
|                      |               |                                 |                         |                    | P0711 Status is   | ≠ Test Failed This Key On or Fault Active |                  |               |

| Component/<br>System                              | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria   | Threshold<br>Value                                    | Secondary<br>Malfunction          | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|---|---------------|---|---|---|-----------------------------------|---|------------------|---------------|
|   |               |   |   | Disable<br>Condition<br>s:                            | MIL not illuminated for<br>DTC's: | TCM: P0658, P0668,<br>P0669, P06AD, P06AE,<br>P0716, P0712, P0713,<br>P0717, P0722, P0723,<br>P0962, P0963, P0966,<br>P0967, P0970, P0971,<br>P215C, P2720, P2721,<br>P2729, P2730<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Transmission<br>Fluid Temperature<br>Sensor (TFT) | P0712         | Transmission fluid<br>temperature thermistor<br>failed at a low voltage | Type of Sensor<br>Used<br><br>If Transmission<br>Fluid Temperature<br>Sensor = Direct<br>Proportional and<br>Temp | CeTFTI_e_<br>= VoltageDir<br>ectProp<br><br><= -74 °C |                                   |   |                  | Two<br>Trips  |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction                               | Enable<br>Conditions                      | Time<br>Required      | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--|---|-----------------------|---------------|
|                      |               |                                 | If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp | >= -74 °C          |  |   |                       |               |
|                      |               |                                 | Either condition above will satisfy the fail conditions                   |                    |  |   | >= 60 Fail Time (Sec) |               |
|                      |               |                                 |   |                    | Ignition Voltage Lo                                    | >= 8.599609 Volts                         |                       |               |
|                      |               |                                 |   |                    | Ignition Voltage Hi                                    | <= 31.99902 Volts                         |                       |               |
|                      |               |                                 |   |                    | Engine Speed Lo  | >= 400 RPM                                |                       |               |
|                      |               |                                 |   |                    | Engine Speed Hi  | <= 7500 RPM                               |                       |               |
|                      |               |                                 |   |                    | Engine Speed is within the allowable limits for        | >= 5 Sec                                  |                       |               |
|                      |               |                                 |   |                    | P0712 Status is  | ≠ Test Failed This Key On or Fault Active |                       |               |
|                      |               |                                 |   |                    | For Hybrids, below conditions must also be met         |   |                       |               |
|                      |               |                                 |   |                    | Estimated Motor Power Loss                             | >= 0 kW                                   |                       |               |
|                      |               |                                 |   |                    | Estimated Motor Power Loss greater than limit for time | >= 0 Sec                                  |                       |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                        | Fault<br>Code | Monitor Strategy<br>Description                                    | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required      | Mil<br>Illum. |
|---|---------------|--|---|--|---|--|-----------------------|---------------|
|   |               |  |   |  | Lost Communication with Hybrid Processor Control Module<br><br>Estimated Motor Power Loss Fault<br><br><b>Disable Conditions:</b> | = FALSE<br><br>= FALSE<br><br>TCM: P0716, P0717, P0722, P0723<br><br>ECM: None |                       |               |
| Transmission Fluid Temperature Sensor (TFT) | P0713         | Transmission fluid temperature thermistor failed at a high voltage | Type of Sensor Used<br><br>If Transmission Fluid Temperature Sensor = Direct Proportional and Temp<br><br>If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp | CeTFTI_e_VoltageDirectProp<br><br>>= 174 °C<br><br><= 174 °C |   |  |                       | Two Trips     |
|   |               |  | Either condition above will satisfy the fail conditions   |  |   |  | >= 60 Fail Time (Sec) |               |
|   |               |  |   |  | Ignition Voltage Lo   | >= 8.599609 Volts  |                       |               |
|   |               |  |   |  | Ignition Voltage Hi   | <= 31.99902 Volts  |                       |               |



13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                   | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria               | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required       | Mil<br>Illum. |
|--|---------------|---------------------------------|---------------------------------------|--------------------|---|---|------------------------|---------------|
|  |               |                                 |                                       |                    | Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br>P0713 Status is<br><br>MIL not Illuminated for<br>DTC's:               | >= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>≠ Test Failed This Key On or Fault Active<br><br>TCM: P0713, P0716, P0717, P0722, P0723<br>ECM: None |                        |               |
| Transmission Input Speed Sensor (TISS) | P0716         | Input Speed Sensor Performance  | Transmission Input Speed Sensor Drops | >= 900 RPM         |   |   | >= 0.8 Fail Time (Sec) | One Trip      |
|  |               |                                 |                                       |                    | Engine Torque is<br>Engine Torque is<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the allowable limits for<br>Vehicle Speed is<br>Throttle Position is | >= 0 N*m<br><= 8191.875 N*m<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br>>= 10 Kph<br>>= 0 Pct   |                        |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions                                     | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|--|------------------|---------------|
|                      |               |                                 |                         |                    | -----<br>Transmission Input Speed<br>is                                 | >= 0 RPM   |                  |               |
|                      |               |                                 |                         |                    | The previous requirement<br>has been satisfied for                      | >= 0 Sec   |                  |               |
|                      |               |                                 |                         |                    | -----<br>The change (loop to loop)<br>in transmission input<br>speed is | < 8191.875 RPM/Lo<br>op                                  |                  |               |
|                      |               |                                 |                         |                    | The previous requirement<br>has been satisfied for                      | >= 0 Sec   |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal<br>Valid                                       | = TRUE Boolean   |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Signal<br>Valid   | = TRUE Boolean   |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage  | >= 8.599609 Volts  |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage  | <= 31.99902 Volts  |                  |               |
|                      |               |                                 |                         |                    | P0716 Status is not   | = Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                         | Fault<br>Code | Monitor Strategy<br>Description           | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required          | Mil<br>Illum. |
|--|---------------|---|--|--------------------|--|--|---------------------------|---------------|
|  |               |   |  |                    | Disa<br>ble<br>Con<br>diti<br>on<br>s:<br><br>MIL not Illuminated for<br>DTC's:  | TCM: P0717, P0752,<br>P0973, P0974<br><br>ECM: P0101, P0102,<br>P0103, P0121, P0122,<br>P0123  |                           |               |
| Transmission<br>Input Speed<br>Sensor (TISS) | P0717         | Input Speed Sensor<br>Circuit Low Voltage | Fail<br>Case<br>1 Transmission Input<br>Speed is   | < 33 RPM           |  |  | >= 4.5 Fail Time<br>(Sec) | One<br>Trip   |
|  |               |   | Fail<br>Case<br>2 When P0722 DTC<br>Status equal to<br>Test Failed and<br>Transmission Input<br>Speed is | < 653.125 RPM      | Controller uses a single<br>power supply for the<br>speed sensors  | = 1 Boolean  |                           |               |
|  |               |   |  |                    | Engine Torque is<br>Engine Torque is<br>Vehicle Speed<br>Engine Torque Signal<br>Valid<br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the<br>allowable limits for | >= 90 N*m<br><= 8191.875 N*m<br>>= 12 Kph<br>= TRUE Boolean<br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec |                           |               |

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MAIN SECTION

| Component/<br>System                          | Fault<br>Code | Monitor Strategy<br>Description            | Malfunction<br>Criteria                          | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required          | Mil<br>Illum. |
|---|---------------|--|--|--------------------|---|---|---------------------------|---------------|
|   |               |  |  |                    | P0717 Status is not   | =<br>Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                           |               |
|   |               |  |  |                    | Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's: | TCM: P0722, P0723<br>ECM: P0101, P0102,<br>P0103            |                           |               |
| Transmission<br>Output Speed<br>Sensor (TOSS) | P0722         | Output Speed Sensor<br>Circuit Low Voltage | Transmission<br>Output Speed<br>Sensor Raw Speed | <= 35 RPM          |   |   | >= 4.5 Fail Time<br>(Sec) | One<br>Trip   |
|   |               |  |  |                    | P0722 Status is not   | =<br>Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                           |               |
|   |               |  |  |                    | Transmission Input Speed<br>Check                               | = TRUE Boolean  |                           |               |
|   |               |  |  |                    | Engine Torque Check   | = TRUE Boolean  |                           |               |
|   |               |  |  |                    | Throttle Position   | >= 8.000183 Pct   |                           |               |
|   |               |  |  |                    | Transmission Fluid<br>Temperature                               | >= -40 °C   |                           |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions         | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|------------------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Disable this DTC if the PTO is active   | = 1 Boolean                  |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Signal Valid  | = TRUE Boolean               |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal Valid  | = TRUE Boolean               |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage is   | >= 8.599609 Volts            |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage is   | <= 31.99902 Volts            |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is   | >= 400 RPM                   |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is   | <= 7500 RPM                  |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for                                     | >= 5 Sec                     |                  |               |
|                      |               |                                 |                         |                    | Enable_Flags Defined Below  |                              |                  |               |
|                      |               |                                 |                         |                    | The Engine Torque Check is TRUE, if either of the two following conditions are TRUE |                              |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Condition 1   |                              |                  |               |
|                      |               |                                 |                         |                    | Range Shift Status  | ≠ Range shift completed ENUM |                  |               |
|                      |               |                                 |                         |                    | OR  |                              |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Park or Neutral            |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Torque is   | >= 8191.75 N*m       |                  |               |
|                      |               |                                 |                         |                    | Engine Torque is   | <= 8191.75 N*m       |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Condition 2  |                      |                  |               |
|                      |               |                                 |                         |                    | Engine Torque is   | >= 50 N*m            |                  |               |
|                      |               |                                 |                         |                    | Engine Torque is   | <= 8191.75 N*m       |                  |               |
|                      |               |                                 |                         |                    | -----  |                      |                  |               |
|                      |               |                                 |                         |                    | The Transmission Input<br>Speed (TIS) Check is<br>TRUE, if either of the two<br>following conditions are<br>TRUE |                      |                  |               |
|                      |               |                                 |                         |                    | TIS Check Condition 1  |                      |                  |               |
|                      |               |                                 |                         |                    | Transmission Input Speed<br>is   | >= 653.125 RPM       |                  |               |
|                      |               |                                 |                         |                    | Transmission Input Speed<br>is   | <= 5350 RPM          |                  |               |
|                      |               |                                 |                         |                    | TIS Check Condition 2  |                      |                  |               |
|                      |               |                                 |                         |                    | Engine Speed without the<br>brake applied is   | >= 3200 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed with the<br>brake applied is  | >= 3200 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is  | <= 8191.875 RPM      |                  |               |
|                      |               |                                 |                         |                    | Controller uses a single<br>power supply for the<br>speed sensors  | = 1 Boolean          |                  |               |

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MAIN SECTION

| Component/<br>System                          | Fault<br>Code | Monitor Strategy<br>Description             | Malfunction<br>Criteria                          | Threshold<br>Value                | Secondary<br>Malfunction                           | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|---|---------------|---|--|-----------------------------------|--|---|---|---------------|
|   |               |   |  |                                   | Powertrain Brake Pedal is Valid                    | = TRUE Boolean  |   |               |
|   |               |   |  |                                   | <b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b> | <b>MIL not Illuminated for DTC's:</b><br>TCM: P0716, P0717,<br>P0723<br>ECM: P0101, P0102,<br>P0103, P0121, P0122,<br>P0123 |   |               |
| Transmission<br>Output Speed<br>Sensor (TOSS) | P0723         | Output Speed Sensor<br>Circuit Intermittent | Transmission<br>Output Speed<br>Sensor Raw Speed | >= 105 RPM                        |  |   | >= 0<br>Enable<br>Time<br>(Sec)                                     | One<br>Trip   |
|   |               |   | Output Speed<br>Delta                            | <= 8192 RPM                       |  |   | >= 0<br>Enable<br>Time<br>(Sec)                                     |               |
|   |               |   | Output Speed Drop                                | > 650 RPM                         |  |   | >= 1.5<br>Output<br>Speed<br>Drop<br>Recovery<br>Fail Time<br>(Sec) |               |
|   |               |   | AND<br><br>Transmission<br>Range is              | =<br><br>Driven<br>range<br>(R,D) |  |   |   |               |
|   |               |   |  |                                   | -----<br>Range_Disable                             | = FALSE See<br>Below  |   |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                            | Enable<br>Conditions                      | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|---|------------------|---------------|
|                      |               |                                 |                         |                    | OR<br>-----<br>Neutral_Range_Enable                 | = TRUE See Below                          |                  |               |
|                      |               |                                 |                         |                    | And<br>Neutral_Speed_Enable                         | = TRUE See Below                          |                  |               |
|                      |               |                                 |                         |                    | are TRUE concurrently<br>-----                      |   |                  |               |
|                      |               |                                 |                         |                    | Transmission_Range_Enable                           | = TRUE See Below                          |                  |               |
|                      |               |                                 |                         |                    | Transmission_Input_Speed_Enable                     | = TRUE See Below                          |                  |               |
|                      |               |                                 |                         |                    | No Change in Transfer Case Range (High <-> Low) for | >= 5 Seconds                              |                  |               |
|                      |               |                                 |                         |                    | P0723 Status is not                                 | = Test Failed This Key On or Fault Active |                  |               |
|                      |               |                                 |                         |                    | Disable this DTC if the PTO is active               | = 1 Boolean                               |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage is                                 | >= 8.599609 Volts                         |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage is                                 | <= 31.99902 Volts                         |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is                                     | >= 400 RPM                                |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is                                     | <= 7500 RPM                               |                  |               |



13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|------------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for   | >= 5 Sec               |                  |               |
|                      |               |                                 |                         |                    | Enable_Flags Defined Below  |                        |                  |               |
|                      |               |                                 |                         |                    | Transmission_Input_Speed_Enable is TRUE when either TIS Condition 1 or TIS Condition 2 is TRUE: |                        |                  |               |
|                      |               |                                 |                         |                    | TIS Condition 1 is TRUE when both of the following conditions are satisfied for                 | >= 0 Enable Time (Sec) |                  |               |
|                      |               |                                 |                         |                    | Input Speed Delta   | <= 4095.875 RPM        |                  |               |
|                      |               |                                 |                         |                    | Raw Input Speed   | >= 500 RPM             |                  |               |
|                      |               |                                 |                         |                    | TIS Condition 2 is TRUE when ALL of the next two conditions are satisfied                       |                        |                  |               |
|                      |               |                                 |                         |                    | Input Speed   | = 0 RPM                |                  |               |
|                      |               |                                 |                         |                    | A Single Power Supply is used for all speed sensors   | = TRUE Boolean         |                  |               |
|                      |               |                                 |                         |                    | -----   |                        |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions                | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|-------------------------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Neutral_Range_Enable is TRUE when any of the next 3 conditions are TRUE |                                     |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Neutral ENUM                      |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Reverse/Neutral Transitional ENUM |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Neutral/Drive Transitional ENUM   |                  |               |
|                      |               |                                 |                         |                    | And when a drop occurs  |                                     |                  |               |
|                      |               |                                 |                         |                    | Loop to Loop Drop of Transmission Output Speed is                       | > 650 RPM                           |                  |               |
|                      |               |                                 |                         |                    | -----   |                                     |                  |               |
|                      |               |                                 |                         |                    | Range_Disable is TRUE when any of the next three conditions are TRUE    |                                     |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Park ENUM                         |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Park/Reverse Transitional ENUM    |                  |               |
|                      |               |                                 |                         |                    | Input Clutch is not   | = ON (Fully Applied) ENUM           |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions                | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|-------------------------------------|------------------|---------------|
|                      |               |                                 |                         |                    | -----<br>Neutral_Speed_Enable is TRUE when All of the next three conditions are satisfied for | > 1.5 Seconds                       |                  |               |
|                      |               |                                 |                         |                    | Transmission Output Speed   | > 130 RPM                           |                  |               |
|                      |               |                                 |                         |                    | The loop to loop change of the Transmission Output Speed is                                   | < 20 RPM                            |                  |               |
|                      |               |                                 |                         |                    | The loop to loop change of the Transmission Output Speed is                                   | > -10 RPM                           |                  |               |
|                      |               |                                 |                         |                    | -----<br>Transmission_Range_Enable is TRUE when one of the next six conditions is TRUE        |                                     |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Neutral ENUM                      |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Reverse/Neutral Transitional ENUM |                  |               |
|                      |               |                                 |                         |                    | Transmission Range is   | = Neutral/Drive Transitional ENUM   |                  |               |

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                     | Threshold<br>Value | Secondary<br>Malfunction                          | Enable<br>Conditions   | Time<br>Required       | Mil<br>Illum. |
|-------------------------------|---------------|---------------------------------|---|--------------------|---|--|------------------------|---------------|
|                               |               |                                 |   |                    | Time since a driven range (R,D) has been selected | >= Table Based Time Please Refer to Table 21 in supporting documents Sec   |                        |               |
|                               |               |                                 |   |                    | Transmission Output Speed Sensor Raw Speed        | >= 500 RPM   |                        |               |
|                               |               |                                 |   |                    | Output Speed when a fault was detected            | >= 500 RPM   |                        |               |
|                               |               |                                 |   |                    | <b>Disable Condition s:</b>                       | MIL not Illuminated for DTC's:<br>TCM: P0973, P0974, P0976, P0977<br>ECM: P0101, P0102, P0103, P0121, P0122, P0123 |                        |               |
| Torque Converter Clutch (TCC) | P0741         | TCC System Stuck OFF            | TCC Pressure<br><br>Either Condition (A) or (B) Must be Met | >= 750 Kpa         |   |  | >= 2 Enable Time (Sec) | Two Trips     |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value                              | Secondary<br>Malfunction                        | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.              |
|----------------------|---------------|---------------------------------|---|---|---|----------------------|------------------|----------------------------|
|                      |               |                                 | (A) TCC Slip Error @ TCC On Mode  | >= Refer to Table 1 in Supporting Documents RPM |   |                      | >= 5             | Fail Time (Sec)            |
|                      |               |                                 | (B) TCC Slip @ Lock On Mode   | >= 130 RPM                                      |   |                      | >= 5             | Fail Time (Sec)            |
|                      |               |                                 | If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter |   |   |                      | >= 2             | TCC Stuck Off Fail Counter |
|                      |               |                                 |   |   | TCC Mode  | = On or Lock         |                  |                            |
|                      |               |                                 |   |   | Ignition Voltage Lo                             | >= 8.599609 Volts    |                  |                            |
|                      |               |                                 |   |   | Ignition Voltage Hi                             | <= 31.99902 Volts    |                  |                            |
|                      |               |                                 |   |   | Engine Speed                                    | >= 400 RPM           |                  |                            |
|                      |               |                                 |   |   | Engine Speed                                    | <= 7500 RPM          |                  |                            |
|                      |               |                                 |   |   | Engine Speed is within the allowable limits for | >= 5 Sec             |                  |                            |
|                      |               |                                 |   |   | Engine Torque Lo                                | >= 50 N*m            |                  |                            |
|                      |               |                                 |   |   | Engine Torque Hi                                | <= 8191.875 N*m      |                  |                            |
|                      |               |                                 |   |   | Throttle Position Lo                            | >= 8.000183 Pct      |                  |                            |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction             | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--------------------------------------|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Throttle Position Hi                 | <= 99.99847 Pct      |                  |               |
|                      |               |                                 |                         |                    | 2nd Gear Ratio Lo                    | >= 2.194824 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 2nd Gear Ratio High                  | <= 2.525146 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 3rd Gear Ratio Lo                    | >= 1.422852 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 3rd Gear Ratio High                  | <= 1.637085 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 4th Gear Ratio Lo                    | >= 1.069458 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 4th Gear Ratio High                  | <= 1.230469 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 5th Gear Ratio Lo                    | >= 0.790527 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 5th Gear Ratio Hi                    | <= 0.909546 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 6th Gear Ratio Lo                    | >= 0.623047 Ratio    |                  |               |
|                      |               |                                 |                         |                    | 6th Gear Ratio High                  | <= 0.716919 Ratio    |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid<br>Temperature Lo | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid<br>Temperature Hi | <= 130 °C            |                  |               |
|                      |               |                                 |                         |                    | PTO Not Active                       | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Signal<br>Valid        | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal<br>Valid    | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Dynamic Mode                         | = FALSE Boolean      |                  |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                     | Threshold<br>Value                       | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required                     | Mil<br>Illum. |
|----------------------------------|---------------|---------------------------------|---|--|---|--|--------------------------------------|---------------|
|                                  |               |                                 |   |  | <p>P0741 Status is</p> <p><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b></p> <p><b>MIL not Illuminated for<br/>DTC's:</b></p> | <p>Test<br/>Failed<br/>This Key<br/>On or<br/>Fault<br/>Active</p> <p>TCM: P0716, P0717,<br/>P0722, P0723, P0742,<br/>P2763, P2764</p> <p>ECM: P0101, P0102,<br/>P0103, P0106, P0107,<br/>P0108, P0171, P0172,<br/>P0174, P0175, P0201,<br/>P0202, P0203, P0204,<br/>P0205, P0206, P0207,<br/>P0208, P0300, P0301,<br/>P0302, P0303, P0304,<br/>P0305, P0306, P0307,<br/>P0308, P0401, P042E</p> |                                      |               |
| Torque Converter<br>Clutch (TCC) | P0742         | TCC System Stuck ON             | <p>TCC Slip Speed</p> <p>TCC Slip Speed</p> | <p>&gt;= -50 RPM</p> <p>&lt;= 13 RPM</p> |   |  | <p>&gt;= 1.5 Fail Time<br/>(Sec)</p> | One<br>Trip   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction                           | Enable<br>Conditions | Time<br>Required     | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--|----------------------|----------------------|---------------|
|                      |               |                                 | If Above Conditions<br>Have been Met,<br>and Fail Timer<br>Expired, Increment<br>Fail Counter |                    |  |                      | >= 6 Fail<br>Counter |               |
|                      |               |                                 |   |                    | TCC Mode   | = Off                |                      |               |
|                      |               |                                 |   |                    | Enable test if Cmnd Gear<br>= 1stFW and value true | = 1 Boolean          |                      |               |
|                      |               |                                 |   |                    | Enable test if Cmnd Gear<br>= 2nd and value true   | = 0 Boolean          |                      |               |
|                      |               |                                 |   |                    | Engine Speed Hi                                    | <= 6000 RPM          |                      |               |
|                      |               |                                 |   |                    | Engine Speed Lo                                    | >= 500 RPM           |                      |               |
|                      |               |                                 |   |                    | Vehicle Speed Hi                                   | <= 511 KPH           |                      |               |
|                      |               |                                 |   |                    | Vehicle Speed Lo                                   | >= 1 KPH             |                      |               |
|                      |               |                                 |   |                    | Engine Torque Hi                                   | <= 8191.875 Nm       |                      |               |
|                      |               |                                 |   |                    | Engine Torque Lo                                   | >= 80 Nm             |                      |               |
|                      |               |                                 |   |                    | Current Range                                      | ≠ Neutral Range      |                      |               |
|                      |               |                                 |   |                    | Current Range                                      | ≠ Reverse Range      |                      |               |
|                      |               |                                 |   |                    | Transmission Sump<br>Temperature                   | <= 130 °C            |                      |               |
|                      |               |                                 |   |                    | Transmission Sump<br>Temperature                   | >= 18 °C             |                      |               |
|                      |               |                                 |   |                    | Throttle Position Hyst High                        | >= 5.000305 Pct      |                      |               |



13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | AND   |                      |                  |               |
|                      |               |                                 |                         |                    | Max Vehicle Speed to Meet Throttle Enable                                   | <= 8 KPH             |                  |               |
|                      |               |                                 |                         |                    | Once Hyst High has been met, the enable will remain while Throttle Position | >= 2.000427 Pct      |                  |               |
|                      |               |                                 |                         |                    | Disable for Throttle Position   | >= 75 Pct            |                  |               |
|                      |               |                                 |                         |                    | Disable if PTO active and value true  | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in D1 and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in D2 and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in D3 and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in D4 and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in D5 and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in MUMD and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | Disable if in TUTD and value true   | = 1 Boolean          |                  |               |
|                      |               |                                 |                         |                    | 4 Wheel Drive Low Active  | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Disable if Air Purge active and value false                                 | = 0 Boolean          |                  |               |
|                      |               |                                 |                         |                    | RVT Diagnostic Active   | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage  | >= 8.599609 V        |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                        | Enable<br>Conditions                      | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|---|------------------|---------------|
|                      |               |                                 |                         |                    | Ignition Voltage                                | <= 31.99902 V                             |                  |               |
|                      |               |                                 |                         |                    | Vehicle Speed                                   | <= 511 KPH                                |                  |               |
|                      |               |                                 |                         |                    | Engine Speed                                    | >= 400 RPM                                |                  |               |
|                      |               |                                 |                         |                    | Engine Speed                                    | <= 7500 RPM                               |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for | >= 5 Sec                                  |                  |               |
|                      |               |                                 |                         |                    | Engine Torque Signal Valid                      | = TRUE Boolean                            |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal Valid                  | = TRUE Boolean                            |                  |               |
|                      |               |                                 |                         |                    | P0742 Status is                                 | ≠ Test Failed This Key On or Fault Active |                  |               |

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MAIN SECTION

| Component/<br>System      | Fault<br>Code | Monitor Strategy<br>Description     | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|---------------------------|---------------|-------------------------------------|---|--|---|---|--|---------------|
|                           |               |                                     |   |  | Disa<br>ble<br>Con<br>diti<br>on<br>s:<br><br>MIL not Illuminated for<br>DTC's: | TCM: P0716, P0717,<br>P0722, P0723, P0741,<br>P2763, P2764<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |  |               |
| Mode 2 Multiplex<br>Valve | P0751         | Shift Solenoid Valve A<br>Stuck Off | Commaned Gear<br>Slip<br><br>Commanded Gear<br><br>Gear Ratio<br><br>Gear Ratio<br><br>If the above<br>parameters are<br>true | >= 400 RPM<br><br>= 1st Lock rpm<br><br><= 1.2095947<br><br>>= 1.0943604 |   |   | >= 0.2 Fail Tmr<br><br>= 5 Fail<br>Counts<br><br>≠ 0 Neutral<br>Timer<br>(Sec) | Two<br>Trips  |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions         | Time<br>Required        | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|------------------------------|-------------------------|---------------|
|                      |               |                                 |                         |                    |  |                              | >= 0.3 Fail Timer (Sec) |               |
|                      |               |                                 |                         |                    |  |                              | >= 8 Counts             |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo  | >= 8.599609 Volts            |                         |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi  | <= 31.99902 Volts            |                         |               |
|                      |               |                                 |                         |                    | Engine Speed Lo  | >= 400 RPM                   |                         |               |
|                      |               |                                 |                         |                    | Engine Speed Hi  | <= 7500 RPM                  |                         |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for                  | >= 5 Sec                     |                         |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                                   | >= -6.65625 °C               |                         |               |
|                      |               |                                 |                         |                    | Range Shift State  | = Range Shift Completed ENUM |                         |               |
|                      |               |                                 |                         |                    | TPS  | >= 0.500488 %                |                         |               |
|                      |               |                                 |                         |                    | OR   |                              |                         |               |
|                      |               |                                 |                         |                    | Output Speed   | >= 67 RPM                    |                         |               |
|                      |               |                                 |                         |                    | Throttle Position Signal Valid from ECM                          | = TRUE Boolean               |                         |               |
|                      |               |                                 |                         |                    | Engine Torque Signal Valid from ECM, High side driver is enabled | = TRUE Boolean               |                         |               |
|                      |               |                                 |                         |                    | High-Side Driver is Enabled                                      | = TRUE Boolean               |                         |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault   | = FALSE Boolean              |                         |               |

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MAIN SECTION

| Component/<br>System   | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction           | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|------------------------|---------------|---------------------------------|---|--------------------|------------------------------------|--|------------------|---------------|
|                        |               |                                 |   |                    | Output Speed Sensor fault          | = FALSE Boolean  |                  |               |
|                        |               |                                 |   |                    | Default Gear Option is not present | = TRUE   |                  |               |
|                        |               |                                 |   |                    | <b>Disable Condition s:</b>        | <b>MIL not Illuminated for DTC's:</b> TCM: P0716, P0717, P0722, P0723, P182E<br><br>ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E |                  |               |
| Mode 2 Multiplex Valve | P0752         | Shift Solenoid Valve A Stuck On | Gear Box Slip   | >= 400 RPM         |                                    |  |                  | One Trip      |
|                        |               |                                 | Commanded Gear  | = 3rd Gear         |                                    |  |                  |               |
|                        |               |                                 | Commanded Gear has Achieved 1st Locked OR 1st Free-Wheel OR 2nd with Mode 2 Sol. Commanded On | = TRUE Boolean     |                                    |  |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                        | Threshold<br>Value           | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|------------------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | If the above<br>parameters are<br>true         |                              |                          |                      | Please<br>Refer<br>to<br>Table Neutral<br>>= 16 in Timer<br>Supporting (Sec)<br>Documents |               |
|                      |               |                                 | Command 4th<br>Gear once Output<br>Shaft Speed | <= 400 RPM                   |                          |                      |   |               |
|                      |               |                                 | If Gear Ratio<br>And Gear Ratio                | >= 3.8256836<br><= 4.2283936 |                          |                      | >= 1.5 Fail Timer<br>(Sec)  |               |
|                      |               |                                 |  |                              |                          |                      | >= 5 Counts   |               |
|                      |               |                                 |  |                              | Ignition Voltage Lo      | >= 8.599609 Volts    |   |               |
|                      |               |                                 |  |                              | Ignition Voltage Hi      | <= 31.99902 Volts    |   |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                        | Enable<br>Conditions         | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|------------------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Speed Lo                                 | >= 400 RPM                   |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                 | <= 7500 RPM                  |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for | >= 5 Sec                     |                  |               |
|                      |               |                                 |                         |                    | High-Side Driver is Enabled                     | = TRUE Boolean               |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal Valid from ECM         | = TRUE Boolean               |                  |               |
|                      |               |                                 |                         |                    | Output Speed                                    | >= 67 RPM                    |                  |               |
|                      |               |                                 |                         |                    | OR  |                              |                  |               |
|                      |               |                                 |                         |                    | TPS   | >= 0.500488 %                |                  |               |
|                      |               |                                 |                         |                    | Range Shift State                               | = Range Shift Completed ENUM |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                  | >= -6.65625 °C               |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                        | = FALSE Boolean              |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                       | = FALSE Boolean              |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present              | = TRUE                       |                  |               |

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MAIN SECTION

| Component/<br>System      | Fault<br>Code | Monitor Strategy<br>Description     | Malfunction<br>Criteria  | Threshold<br>Value                       | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|---------------------------|---------------|-------------------------------------|--|--|---|---|---|---------------|
|                           |               |                                     |  |  | <p>Disable<br/>Condition<br/>s:</p> <p>MIL not Illuminated for<br/>DTC's:</p> | <p>TCM: P0716, P0717,<br/>P0722, P0723, P182E</p> <p>ECM: P0101, P0102,<br/>P0103, P0106, P0107,<br/>P0108, P0171, P0172,<br/>P0174, P0175, P0201,<br/>P0202, P0203, P0204,<br/>P0205, P0206, P0207,<br/>P0208, P0300, P0301,<br/>P0302, P0303, P0304,<br/>P0305, P0306, P0307,<br/>P0308, P0401, P042E</p> |   |               |
| Mode 2 Multiplex<br>Valve | P0756         | Shift Solenoid Valve B<br>Stuck Off | <p><u>Fail</u><br/><u>Case</u> Commanded Gear<br/>1</p> <p>Gear Box Slip</p> | <p>= 1st Locked</p> <p>&gt;= 400 RPM</p> |   |   | <p>Please<br/>Refer<br/>to<br/>Table Neutral<br/>&gt;= 5 in Timer<br/>Supporting (Sec)<br/>Docum<br/>ents</p> | One<br>Trip   |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions   | Time<br>Required            | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|--|-----------------------------|---------------|
|                      |               |                                 | Intrusive Shift to<br>2nd<br><br>Commanded Gear<br>Previous = 1st Locked Gear<br><br>Gear Ratio <= 2.4821777<br><br>Gear Ratio >= 2.2458496<br><br>If the above<br>parameters are<br>true |                    |                          |  | >= 1 sec<br><br>>= 3 counts |               |
|                      |               |                                 |   |                    |                          | Ignition Voltage Lo >= 8.599609 Volts<br>Ignition Voltage Hi <= 31.99902 Volts<br>Engine Speed Lo >= 400 RPM<br>Engine Speed Hi <= 7500 RPM<br>Engine Speed is within the<br>allowable limits for >= 5 Sec<br>Output Speed >= 67 RPM<br>OR<br>TPS >= 0.500488 %<br>Range Shift State = Range Shift Completed ENUM<br>Transmission Fluid Temperature >= -6.65625 °C |                             |               |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                   | Malfunction<br>Criteria                           | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|-------------------------------|---------------|---|---|--------------------|--|--|------------------|---------------|
|                               |               |   |   |                    | High-Side Driver is Enabled  | = TRUE Boolean   |                  |               |
|                               |               |   |   |                    | Throttle Position Signal Valid from ECM                            | = TRUE Boolean   |                  |               |
|                               |               |   |   |                    | Input Speed Sensor fault   | = FALSE Boolean  |                  |               |
|                               |               |   |   |                    | Output Speed Sensor fault  | = FALSE Boolean  |                  |               |
|                               |               |   |   |                    | Default Gear Option is not present                                 | = TRUE   |                  |               |
|                               |               |   |   |                    | <b>Disable Condition:</b><br><b>MIL not Illuminated for DTC's:</b> | TCM: P0716, P0717, P0722, P0723, P182E<br><br>ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E |                  |               |
| Variable Bleed Solenoid (VBS) | P0776         | Pressure Control (PC) Solenoid B Stuck Off [C35R] | <u>Fail Case</u><br>1 Case: Steady State 3rd Gear |                    |  |  |                  | One Trip      |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                             | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | Commanded Gear = 3rd Gear                           |                    |                          |                      |   |               |
|                      |               |                                 | Gearbox Slip >= 400 RPM                             |                    |                          |                      |   |               |
|                      |               |                                 | Command 4th Gear once Output Shaft Speed <= 400 RPM |                    |                          |                      |   |               |
|                      |               |                                 | If Gear Ratio >= 1.0943604                          |                    |                          |                      |   |               |
|                      |               |                                 | And Gear Ratio <= 1.2095947                         |                    |                          |                      |   |               |
|                      |               |                                 |   |                    |                          |                      | Please Refer to Table Neutral Timer (Sec)<br>>= 16 in Supporting Documents<br><br>>= 3 Fail Timer (Sec) |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>It the above condiations are true, Increment 3rd gear fail counter</p> <p>and C35R Fail counter</p>                              |                    |                          |                      | <p>&gt;= 3 3rd Gear Fail Counts</p> <p>or</p> <p>&gt;= 14 3-5R Clutch Fail Counts</p> |               |
|                      |               |                                 | <p><u>Fail Case</u><br/><u>2</u> Case: Steady State 5th Gear</p> <p>Commanded Gear = 5th Gear</p> <p>Gearbox Slip &gt;= 400 Rpm</p> |                    |                          |                      | <p>&gt;= 5 in Supporting Documents</p> <p>Neutral Timer (Sec)</p>                     |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--|---|------------------|---------------|
|                      |               |                                 | <p>Intrusive Test:<br/>Command 6th<br/>Gear</p> <p>If attained<br/>Gear=6th gear<br/>Time</p> <p>It the above<br/>condiations are<br/>true, Increment 5th<br/>gear fail counter</p> <p>and C35R Fail<br/>counter</p> | <p>Please<br/>refer to Shift<br/>Table 3 in Time<br/>supporting (Sec)<br/>documents</p> <p>&gt;=</p> |  | <p>&gt;= 3</p> <p>5th Gear<br/>Fail<br/>Counts</p> <p>or</p> <p>&gt;= 14</p> <p>3-5R<br/>Clutch<br/>Fail<br/>Counts</p> |                  |               |
|                      |               |                                 |  |  | <p>PRNDL State defaulted</p> <p>inhibit RVT</p> <p>IMS fault pending<br/>indication</p> <p>TPS validity flag</p> | <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= TRUE Boolean</p>                              |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                           | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Hydraulic System<br>Pressurized                    | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Minimum output speed for<br>RVT                    | >= 67 RPM            |                  |               |
|                      |               |                                 |                         |                    | A OR B<br>(A) Output speed enable                  | >= 67 RPM            |                  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal<br>enable                    | >= 0.500488 Pct      |                  |               |
|                      |               |                                 |                         |                    | Common Enable Criteria                             |                      |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo                                | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi                                | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo                                    | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                    | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the<br>allowable limits for | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal<br>valid                  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | HSD Enabled  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid<br>Temperature                  | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                           | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                          | = FALSE Boolean      |                  |               |

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                 | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction           | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|-------------------------------|---------------|---|---|--|------------------------------------|--|------------------|---------------|
|                               |               |   |   |  | Default Gear Option is not present | = TRUE   |                  |               |
|                               |               |   |   |  | <b>Disable Condition s:</b>        | TCM: P0716, P0717, P0722, P0723, P182E<br><br>ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E |                  |               |
| Variable Bleed Solenoid (VBS) | P0777         | Pressure Control (PC) Solinoid B Stuck On [C35R] (Steady State) | <u>Fail Case</u><br>1 Case: Steady State 1st<br><br>Attained Gear slip<br><br>If the Above is True for Time | >= 400 RPM<br><br>Table Based Time Enable<br>Please Refer to Table 4 in supporting documents |                                    |  |                  | One Trip      |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | Intrusive test:<br>(CBR1 clutch exhausted)<br><br>Gear Ratio <= 1.6086426<br><br>Gear Ratio >= 1.4554443<br><br>If the above parameters are true |                    |                          |                      | >= 1.1 Fail Timer (Sec)<br><br>>= 2 Fail Count in 1st Gear or<br>>= 3 Total Fail Counts |               |
|                      |               |                                 | <u>Fail Case</u><br>2 Case: Steady State 2nd gear  |                    |                          |                      |   |               |



| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 1 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 2 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table Based Time<br>Please Refer to<br>Table 17 in supporting documents<br>>= Sec         |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | Intrusive test:<br>(CB26 clutch exhausted)<br><br>Gear Ratio <= 1.6086426<br><br>Gear Ratio >= 1.4554443<br><br>If the above parameters are true |                    |                          |                      | >= 1.1 Fail Timer (Sec)<br><br>>= 3 Fail Count in 2nd Gear<br><br>or<br><br>>= 3 Total Fail Counts |               |
|                      |               |                                 | <u>Fail Case</u><br>3 Case: Steady State 4th gear  |                    |                          |                      |  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 1 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 2 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table<br>Based<br>Time<br>Please Sec<br>>= Refer to<br>Table 17 in<br>supporting<br>documents         |                          |                      |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | Intrusive test:<br>(C1234 clutch<br>exhausted)<br><br>Gear Ratio <= 0.8946533<br><br>Gear Ratio >= 0.8094482<br><br>If the above<br>parameters are<br>true |                    |                          |                      | >= 1.1 Fail Timer<br>(Sec)<br><br>>= 3 Fail Count<br>in 4th<br>Gear<br>or<br><br>>= 3 Total Fail<br>Counts |               |
|                      |               |                                 | <u>Fail</u><br><u>Case</u><br><u>4</u> Case: Steady State<br>6th gear  |                    |                          |                      |  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 1 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 2 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table Based Time<br>Please Refer to<br>Table 17 in supporting documents<br>>= Sec         |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|---|---|---|---------------|
|                      |               |                                 | Intrusive test:<br>(CB26 clutch exhausted)<br><br>Gear Ratio <= 0.8946533<br><br>Gear Ratio >= 0.8094482<br><br>If the above parameters are true |                    |   |   | >= 1.1 Fail Timer (Sec)<br><br>>= 3 counts<br><br>>= 1.1 Fail Timer (Sec)<br><br>>= 3 Fail Count in 6th Gear or<br><br>>= 3 Total Fail Counts |               |
|                      |               |                                 |  |                    | PRNDL State defaulted<br><br>inhibit RVT<br><br>IMS fault pending indication<br><br>output speed<br><br>TPS validity flag | = FALSE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>>= 0 RPM<br><br>= TRUE Boolean |   |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                         | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | HSD Enabled                                      | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Hydraulic_System_Pressurized                     | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | A OR B   |                      |                  |               |
|                      |               |                                 |                         |                    | (A) Output speed enable                          | >= 67 Nm             |                  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal enable                     | >= 0.500488 Nm       |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo                              | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi                              | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo                                  | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                  | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for  | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Accelerator Pedal enable | >= 5.000305 Pct      |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | >= 5 Nm              |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | <= 8191.875 Nm       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                   | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                         | = FALSE Boolean      |                  |               |

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                           | Malfunction<br>Criteria   | Threshold<br>Value                          | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|-------------------------------|---------------|---|---|---|--|---|------------------|---------------|
|                               |               |   |   |   | Output Speed Sensor fault<br><br>MIL not Illuminated for<br>DTC's: | = FALSE Boolean<br><br>TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Variable Bleed Solenoid (VBS) | P0777         | Pressure Control (PC) Solenoid B StuckOn [C35R] (Dymanic) | Primary Offgoing Clutch is exhausted (See Table 12 in Supporting Documents for Exhaust Delay Timers)<br><br>Primary Oncoming Clutch Pressure Command Status | = TRUE Boolean<br><br>= Maximum pressurized |  |   |                  | One Trip      |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value       | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Primary Offgoing Clutch Pressure Command Status                       | = Clutch exhaust command |                          |                      |                  |               |
|                      |               |                                 | Range Shift Status  | ≠ Initial Clutch Control |                          |                      |                  |               |
|                      |               |                                 | Attained Gear Slip  | <= 40 RPM                |                          |                      |                  |               |
|                      |               |                                 | If the above conditions are true run appropriate Fail 1 Timers Below: |                          |                          |                      |                  |               |
|                      |               |                                 | fail timer 1 (3-1 shifting with Closed Throttle)                      | >= 0.5                   | Fail Time (Sec)          |                      |                  |               |
|                      |               |                                 | fail timer 1 (3-2 shifting with Throttle)                             | >= 0.2998047             | Fail Time (Sec)          |                      |                  |               |
|                      |               |                                 | fail timer 1 (3-2 shifting with Closed Throttle)                      | >= 0.5                   | Fail Time (Sec)          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | fail timer 1<br>(3-4 shifting with<br>Throttle)        | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(3-4shifting with<br>Closed Throttle)  | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(3-5 shifting with<br>Throttle)        | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(3-5 shifting with<br>Closed Throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-3 shifting with<br>Throttle)        | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-3 shifting with<br>Closed Throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | fail timer 1<br>(5-4 shifting with<br>Throttle)        | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-4 shifting with<br>Closed Throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-6 shifting with<br>Throttle)        | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-6 shifting with<br>Closed Throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If Attained Gear Slip is Less than Above Cal Increment Fail Timers</p> <p>If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter</p> <p>3rd gear fail counter</p> |                    |                          |                      | <p>Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2</p> <p><math>\geq</math> 1 sec</p> <p><math>\geq</math> 3 3rd gear fail counts</p> <p>OR</p> |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.        |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|----------------------------|----------------------|------------------|----------------------|
|                      |               |                                 | 5th gear fail counter   |                    |                            |                      | >= 3             | 5th gear fail counts |
|                      |               |                                 | Total fail counter      |                    |                            |                      | >= 5             | total fail counts    |
|                      |               |                                 |                         |                    | TUT Enable temperature     | >= -6.65625 °C       |                  |                      |
|                      |               |                                 |                         |                    | Input Speed Sensor fault   | = FALSE Boolean      |                  |                      |
|                      |               |                                 |                         |                    | Output Speed Sensor fault  | = FALSE Boolean      |                  |                      |
|                      |               |                                 |                         |                    | Command / Attained Gear    | ≠ 1st Boolean        |                  |                      |
|                      |               |                                 |                         |                    | High Side Driver ON        | = TRUE Boolean       |                  |                      |
|                      |               |                                 |                         |                    | output speed limit for TUT | >= 100 RPM           |                  |                      |
|                      |               |                                 |                         |                    | input speed limit for TUT  | >= 150 RPM           |                  |                      |
|                      |               |                                 |                         |                    | PRNDL state defaulted      | = FALSE Boolean      |                  |                      |
|                      |               |                                 |                         |                    | IMS Fault Pending          | = FALSE Boolean      |                  |                      |
|                      |               |                                 |                         |                    | Service Fast Learn Mode    | = FALSE Boolean      |                  |                      |
|                      |               |                                 |                         |                    | HSD Enabled                | = TRUE Boolean       |                  |                      |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                  | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required  | Mil<br>Illum. |
|-------------------------------|---------------|--|--|--------------------|--|--|---|---------------|
|                               |               |  |  |                    | Default Gear Option is not present<br><br>MIL not Illuminated for DTC's: | = TRUE<br><br>TCM: P0716, P0717, P0722, P0723, P182E<br><br>ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E |   |               |
| Variable Bleed Solenoid (VBS) | P0796         | Pressure Control (PC) Solenoid C Stuck Off [C456] (Steady State) | <u>Fail Case</u><br>1 Case: Steady State 4th Gear<br><br>Gear slip<br><br>Intrusive test: commanded 5th gear | >= 400 RPM         |  |  | Please See Table Neutral 5 For Timer (Sec) 5 For Neutral Time Cal | One Trip      |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>If attained Gear ≠5th for time</p> <p>if the above conditions have been met</p> <p>Increment 4th Gear Fail Counter</p> <p>and C456 Fail Counters</p> | <p>≥</p> <p>Please refer to Table 3 in Shift Time Supporting Documents (Sec)</p> |                          |                      | <p>≥ 3 4th Gear Fail Count</p> <p>OR</p> <p>≥ 14 C456 Fail Counts</p> |               |
|                      |               |                                 | <p><u>Fail Case 2</u> Case: Steady State 5th Gear</p> <p>Gear slip</p>  | <p>≥ 400 RPM</p>   |                          |                      | <p>≥ 5 Please See Table 5 For Neutral Timer (Sec)   Time Cal</p>      |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>Intrusive test:<br/>commanded 6th<br/>gear</p> <p>If attained Gear ≠<br/>6th for time</p> <p>if the above<br/>conditions have<br/>been met</p> <p>Increment 5th Gear<br/>Fail Counter</p> <p>and C456 Fail<br/>Counters</p> | <p>≥</p> <p>Please<br/>Refer to Shift<br/>Table 3 in Time<br/>Supporting (Sec)<br/>Documents</p> |                          |                      | <p>≥ 3 5th Gear<br/>Fail Count</p> <p>OR</p> <p>≥ 14 C456 Fail<br/>Counts</p> |               |
|                      |               |                                 | <p><u>Fail</u><br/><u>Case</u> Case: Steady State<br/>3 6th Gear</p>   |  |                          |                      |   |               |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                     | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--|----------------------|---|---------------|
|                      |               |                                 | Gear slip   | >= 400 RPM         |  |                      | Please<br>See<br>Table Neutral<br>>= 5 For Timer<br>Neutra (Sec)<br>l Time<br>Cal |               |
|                      |               |                                 | Intrusive test:<br>commanded 5th<br>gear                    |                    |  |                      |   |               |
|                      |               |                                 | If attained Gear ≠<br>5th for time                          | >=                 | Please<br>refer to Shift<br>Table 3 in Time<br>Supporting (Sec)<br>Documents |                      |   |               |
|                      |               |                                 | if the above<br>conditions have<br>been met                 |                    |  |                      |   |               |
|                      |               |                                 | Increment 6th Gear<br>Fail Counter and<br>C456 Fail Counter |                    |  |                      | >= 3 6th Gear<br>Fail Count   |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction     | Enable<br>Conditions | Time<br>Required             | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|------------------------------|----------------------|------------------------------|---------------|
|                      |               |                                 | and C456 Fail Counter   |                    |                              |                      | OR<br>>= 14 C456 Fail Counts |               |
|                      |               |                                 |                         |                    | PRNDL State defaulted        | = FALSE Boolean      |                              |               |
|                      |               |                                 |                         |                    | inhibit RVT                  | = FALSE Boolean      |                              |               |
|                      |               |                                 |                         |                    | IMS fault pending indication | = FALSE Boolean      |                              |               |
|                      |               |                                 |                         |                    | TPS validity flag            | = TRUE Boolean       |                              |               |
|                      |               |                                 |                         |                    | Hydraulic System Pressurized | = TRUE Boolean       |                              |               |
|                      |               |                                 |                         |                    | Minimum output speed for RVT | >= 67 RPM            |                              |               |
|                      |               |                                 |                         |                    | A OR B                       |                      |                              |               |
|                      |               |                                 |                         |                    | (A) Output speed enable      | >= 67 RPM            |                              |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal enable | >= 0.500488 Pct      |                              |               |
|                      |               |                                 |                         |                    | Common Enable Criteria       |                      |                              |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo          | >= 8.599609 Volts    |                              |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi          | <= 31.99902 Volts    |                              |               |
|                      |               |                                 |                         |                    | Engine Speed Lo              | >= 400 RPM           |                              |               |
|                      |               |                                 |                         |                    | Engine Speed Hi              | <= 7500 RPM          |                              |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                        | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal valid                  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | HSD Enabled                                     | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                  | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | OutputSpeed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present              | = TRUE               |                  |               |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                 | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|-------------------------------|---------------|---|--|----------------------|---|---|------------------|---------------|
|                               |               |   |  |                      | <p>Disable<br/>Condition<br/>s:</p> <p>MIL not Illuminated for<br/>DTC's:</p> | <p>TCM: P0716, P0717,<br/>P0722, P0723, P182E</p> <p>ECM: P0101, P0102,<br/>P0103, P0106, P0107,<br/>P0108, P0171, P0172,<br/>P0174, P0175, P0201,<br/>P0202, P0203, P0204,<br/>P0205, P0206, P0207,<br/>P0208, P0300, P0301,<br/>P0302, P0303, P0304,<br/>P0305, P0306, P0307,<br/>P0308, P0401, P042E</p> |                  |               |
| Variable Bleed Solenoid (VBS) | P0797         | Pressure Control (PC) Solenoid C Stuck On [C456] (Steady State) | <p><u>Fail Case</u><br/>1 Case: Steady State 1st</p> <p>Attained Gear slip</p> | <p>&gt;= 400 RPM</p> |   |   |                  | One Trip      |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If the Above is True<br/>for Time</p> <p>Intrusive test:<br/>(CBR1 clutch<br/>exhausted)</p> <p>Gear Ratio</p> <p>Gear Ratio</p> <p>If the above<br/>parameters are<br/>true</p> | <p>Table<br/>Based<br/>Time<br/>Please<br/>Refer to<br/>Table 4 in<br/>supporting<br/>documents</p> <p>&gt;=</p> <p>&lt;= 1.2095947</p> <p>&gt;= 1.0943604</p> |                          |                      | <p>&gt;= 1.1 Fail Timer<br/>(Sec)</p> <p>&gt;= 2 Fail Count<br/>in 1st<br/>Gear<br/>or<br/>&gt;= 3 Total Fail<br/>Counts</p> |               |
|                      |               |                                 | <p><u>Fail</u><br/><u>Case</u> Case Steady State<br/><u>2</u> 2nd</p>   |  |                          |                      |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                       | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis          | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 1 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis          | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 2 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time              | Table<br>Based<br>Time<br>Please Sec<br>>= Refer to<br>Table 17 in<br>supporting<br>documents         |                          |                      |                  |               |
|                      |               |                                 | Intrusive test:<br>(CB26 clutch<br>exhausted) |   |                          |                      |                  |               |
|                      |               |                                 | Gear Ratio                                    | <= 1.2095947  |                          |                      |                  |               |
|                      |               |                                 | Gear Ratio                                    | >= 1.0943604  |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                         | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If the above parameters are true</p>         |  |                          |                      | <p>&gt;= 1.1 Fail Timer (Sec)</p> <p>&gt;= 3 Fail Count in 2nd Gear</p> <p>or</p> <p>&gt;= 3 Total fail counts</p> |               |
|                      |               |                                 | <p><u>Fail Case 3</u> Case Steady State 3rd</p> | <p>Table Based value<br/>Please Refer to 3D ec Table 1 in supporting documents</p> |                          |                      |  |               |
|                      |               |                                 | <p>Max Delta Output Speed Hysteresis</p>        | <p>&gt;= rpm/s</p>   |                          |                      |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                       | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.       |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|------------------|---------------------|
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis          | Table<br>Based<br>value<br>Please rpm/s<br>Refer to 3D ec<br>Table 2 in<br>supporting<br>documents<br>>= |                          |                      |                  |                     |
|                      |               |                                 | If the Above is True<br>for Time              | Table<br>Based<br>Time<br>Please Sec<br>Refer to<br>Table 17 in<br>supporting<br>documents<br>>=         |                          |                      |                  |                     |
|                      |               |                                 | Intrusive test:<br>(C35R clutch<br>exhausted) |  |                          |                      |                  |                     |
|                      |               |                                 | Gear Ratio                                    | <= 1.2095947   |                          |                      |                  |                     |
|                      |               |                                 | Gear Ratio                                    | >= 1.0943604   |                          |                      |                  |                     |
|                      |               |                                 | If the above<br>parameters are<br>true        |  |                          |                      | >= 1.1           | Fail Timer<br>(Sec) |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction     | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|------------------------------|----------------------|--|---------------|
|                      |               |                                 |                         |                    |                              |                      | Fail Count<br>>= 3 in 3rd Gear<br>OR<br>>= 3 Total Fail Counts |               |
|                      |               |                                 |                         |                    | PRNDL State defaulted        | = FALSE Boolean      |  |               |
|                      |               |                                 |                         |                    | inhibit RVT                  | = FALSE Boolean      |  |               |
|                      |               |                                 |                         |                    | IMS fault pending indication | = FALSE Boolean      |  |               |
|                      |               |                                 |                         |                    | output speed                 | >= 0 RPM             |  |               |
|                      |               |                                 |                         |                    | TPS validity flag            | = TRUE Boolean       |  |               |
|                      |               |                                 |                         |                    | HSD Enabled                  | = TRUE Boolean       |  |               |
|                      |               |                                 |                         |                    | Hydraulic_System_Pressurized | = TRUE Boolean       |  |               |
|                      |               |                                 |                         |                    | A OR B                       |                      |  |               |
|                      |               |                                 |                         |                    | (A) Output speed enable      | >= 67 Nm             |  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal enable | >= 0.500488 Nm       |  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo          | >= 8.599609 Volts    |  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi          | <= 31.99902 Volts    |  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo              | >= 400 RPM           |  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi              | <= 7500 RPM          |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                         | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for  | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Accelerator Pedal enable | >= 5.000305 Pct      |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | >= 5 Nm              |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | <= 8191.875 Nm       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                   | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                         | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present               | = TRUE               |                  |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description                                  | Malfunction<br>Criteria   | Threshold<br>Value  | Secondary<br>Malfunction          | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|----------------------------------|---------------|--|---|---|-----------------------------------|--|------------------|---------------|
|                                  |               |  |   | Disa<br>ble<br>Con<br>diti<br>on<br>s:  | MIL not illuminated for<br>DTC's: | TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Variable Bleed<br>Solenoid (VBS) | P0797         | Pressure Control (PC)<br>Solenoid C Stuck On<br>[C456] (Dynamic) | <p>Primary Offgoing<br/>Clutch is<br/>exhausted (See<br/>Table 11 in<br/>Supporting<br/>Documents for<br/>Exhaust Delay<br/>Timers)</p> <p>Primary Oncoming<br/>Clutch Pressure<br/>Command Status</p> <p>Primary Offgoing<br/>Clutch Pressure<br/>Command Status</p> <p>Range Shift Status</p> | <p>= TRUE Boole<br/>an</p> <p>= Maximum<br/>pressurized</p> <p>= Clutch<br/>exhaust<br/>command</p> <p>≠ Initial<br/>Clutch<br/>Control</p> |                                   |  |                  | One<br>Trip   |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value           | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|------------------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Attained Gear Slip<br><br>If the above conditions are true increment appropriate Fail 1 Timers Below: | <= 40 RPM                    |                          |                      |                  |               |
|                      |               |                                 | fail timer 1 (4-1 shifting with throttle)   | >= 0.2998047 Fail Time (Sec) |                          |                      |                  |               |
|                      |               |                                 | fail timer 1 (4-1 shifting without throttle)  | >= 0.5 Fail Time (Sec)       |                          |                      |                  |               |
|                      |               |                                 | fail timer 1 (4-2 shifting with throttle)   | >= 0.2998047 Fail Time (Sec) |                          |                      |                  |               |
|                      |               |                                 | fail timer 1 (4-2 shifting without throttle)  | >= 0.5 Fail Time (Sec)       |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                            | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | fail timer 1<br>(4-3 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(4-3 shifting without<br>throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-3 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(5-3 shifting without<br>throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(6-2 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(6-2 shifting without<br>throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If Attained Gear Slip is Less than Above Cal Increment Fail Timers</p>                                       |                    |                          |                      | <p>Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2</p> <p style="text-align: right;">sec</p>          |               |
|                      |               |                                 | <p>If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter</p> |                    |                          |                      | <p style="text-align: right;">Fail Counter From 4th Gear</p>   |               |
|                      |               |                                 | <p>4th gear fail counter</p>  |                    |                          |                      | <p style="text-align: right;">&gt;= 3</p>  |               |
|                      |               |                                 | <p>5th gear fail counter</p>  |                    |                          |                      | <p style="text-align: right;">OR</p> <p style="text-align: right;">Fail Counter From 5th Gear</p> <p style="text-align: right;">&gt;= 3</p> <p style="text-align: right;">OR</p> |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.              |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|----------------------------|----------------------|------------------|----------------------------|
|                      |               |                                 | 6th gear fail counter   |                    |                            |                      | >= 3             | Fail Counter From 6th Gear |
|                      |               |                                 | Total fail counter      |                    |                            |                      | >= 5             | OR<br>Total Fail Counter   |
|                      |               |                                 |                         |                    | TUT Enable temperature     | >= -6.65625 °C       |                  |                            |
|                      |               |                                 |                         |                    | Input Speed Sensor fault   | = FALSE Boolean      |                  |                            |
|                      |               |                                 |                         |                    | Output Speed Sensor fault  | = FALSE Boolean      |                  |                            |
|                      |               |                                 |                         |                    | Command / Attained Gear    | ≠ 1st Boolean        |                  |                            |
|                      |               |                                 |                         |                    | High Side Driver ON        | = TRUE Boolean       |                  |                            |
|                      |               |                                 |                         |                    | output speed limit for TUT | >= 100 RPM           |                  |                            |
|                      |               |                                 |                         |                    | input speed limit for TUT  | >= 150 RPM           |                  |                            |
|                      |               |                                 |                         |                    | PRNDL state defaulted      | = FALSE Boolean      |                  |                            |
|                      |               |                                 |                         |                    | IMS Fault Pending          | = FALSE Boolean      |                  |                            |
|                      |               |                                 |                         |                    | Service Fast Learn Mode    | = FALSE Boolean      |                  |                            |
|                      |               |                                 |                         |                    | HSD Enabled                | = TRUE Boolean       |                  |                            |

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum.     |
|----------------------------------|---------------|---------------------------------|--|--------------------|----------------------------|--|------------------|-------------------|
|                                  |               |                                 |  |                    | Disable<br>Condition<br>s: | MIL not Illuminated for<br>DTC's: TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |                   |
| Tap Up Tap Down<br>Switch (TUTD) | P0815         | Upshift Switch Circuit          | <u>Fail</u><br><u>Case</u><br>1 Tap Up Switch<br>Stuck in the Up<br>Position in Range 1<br>Enabled | = 1 Boolean        |                            |  |                  | Special<br>No MIL |
|                                  |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 2<br>Enabled                                 | = 1 Boolean        |                            |  |                  |                   |
|                                  |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 3<br>Enabled                                 | = 1 Boolean        |                            |  |                  |                   |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 4<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 5<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 6<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Neutral<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Park<br>Enabled    | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Reverse<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required     | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|----------------------|---------------|
|                      |               |                                 | Tap Up Switch ON  | = TRUE Boolean     |                          |                      | >= 1 Fail Time (Sec) |               |
|                      |               |                                 | <u>Fail Case 2</u><br>Tap Up Switch Stuck in the Up Position in Range 1 Enabled | = 1 Boolean        |                          |                      |                      |               |
|                      |               |                                 | Tap Up Switch Stuck in the Up Position in Range 2 Enabled                       | = 1 Boolean        |                          |                      |                      |               |
|                      |               |                                 | Tap Up Switch Stuck in the Up Position in Range 3 Enabled                       | = 1 Boolean        |                          |                      |                      |               |
|                      |               |                                 | Tap Up Switch Stuck in the Up Position in Range 4 Enabled                       | = 1 Boolean        |                          |                      |                      |               |
|                      |               |                                 | Tap Up Switch Stuck in the Up Position in Range 5 Enabled                       | = 1 Boolean        |                          |                      |                      |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required          | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|---------------------------|---------------|
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 6<br>Enabled | = 1 Boolean        |                          |                      |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Neutral<br>Enabled | = 1 Boolean        |                          |                      |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Park<br>Enabled    | = 1 Boolean        |                          |                      |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Reverse<br>Enabled | = 1 Boolean        |                          |                      |                           |               |
|                      |               |                                 | Tap Up Switch ON   | = TRUE Boolean     |                          |                      |                           |               |
|                      |               |                                 | NOTE: Both<br>Failcase1 and<br>Failcase 2 Must Be<br>Met           |                    |                          |                      | >= 600 Fail Time<br>(Sec) |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--------------------------|---|------------------|---------------|
|                      |               |                                 |                         |                    |                          | Time Since Last Range Change >= 1 Enable Time (Sec)<br><br>Ignition Voltage Lo >= 8.599609 Volts<br>Ignition Voltage Hi <= 31.99902 Volts<br>Engine Speed Lo >= 400 RPM<br>Engine Speed Hi <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br><br>P0815 Status is ≠ Test Failed This Key On or Fault Active |                  |               |
|                      |               |                                 |                         |                    | Disable Condition s:     | MIL not Illuminated for DTC's: TCM: P0816, P0826, P182E, P1876, P1877, P1915, P1761<br>ECM: None  |                  |               |

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MAIN SECTION

| Component/<br>System   | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.     |
|--|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|-------------------|
| Tap Up Tap Down<br>Switch (TUTD)                                       | P0816         | Downshift Switch Circuit        | <u>Fail<br/>Case</u><br>1  |                    |                          |                      |                  | Special<br>No MIL |
|  |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 1<br>Enabled | = 1 Boolean        |                          |                      |                  |                   |
|  |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 2<br>Enabled | = 1 Boolean        |                          |                      |                  |                   |
|  |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 3<br>Enabled | = 1 Boolean        |                          |                      |                  |                   |
|  |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 4<br>Enabled | = 1 Boolean        |                          |                      |                  |                   |
| Tap Down Switch<br>Stuck in the Down<br>Position in Range 5<br>Enabled | = 1 Boolean   |                                 |  |                    |                          |                      |                  |                   |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch Stuck in the Down Position in Range 6 Enabled                       | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch Stuck in the Down Position in Range Neutral Enabled                 | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch Stuck in the Down Position in Range Park Enabled                    | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch Stuck in the Down Position in Range Reverse Enabled                 | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch ON  | = TRUE Boolean     |                          |                      | >= 1 sec         |               |
|                      |               |                                 | <u>Fail Case 2</u><br>Tap Down Switch Stuck in the Down Position in Range 1 Enabled | = 1 Boolean        |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 2<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 3<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 4<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 5<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 6<br>Enabled | = 1 Boolean        |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Neutral<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Park<br>Enabled    | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Reverse<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>ON  | = TRUE Boolean     |                          |                      |                  |               |
|                      |               |                                 | NOTE: Both<br>Failcase1 and<br>Failcase 2 Must Be<br>Met               |                    |                          |                      | >= 600 sec       |               |



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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria            | Threshold<br>Value  | Secondary<br>Malfunction                        | Enable<br>Conditions  | Time<br>Required      | Mil<br>Illum.  |
|-------------------------------|---------------|----------------------------------|------------------------------------|---------------------|---|---|-----------------------|----------------|
|                               |               |                                  |                                    |                     | Time Since Last Range Change                    | >= 1 Enable Time (Sec)  |                       |                |
|                               |               |                                  |                                    |                     | Ignition Voltage Lo                             | >= 8.599609 Volts   |                       |                |
|                               |               |                                  |                                    |                     | Ignition Voltage Hi                             | <= 31.99902 Volts   |                       |                |
|                               |               |                                  |                                    |                     | Engine Speed Lo                                 | >= 400 RPM  |                       |                |
|                               |               |                                  |                                    |                     | Engine Speed Hi                                 | <= 7500 RPM   |                       |                |
|                               |               |                                  |                                    |                     | Engine Speed is within the allowable limits for | >= 5 Sec  |                       |                |
|                               |               |                                  |                                    |                     | P0816 Status is                                 | ≠ Test Failed This Key On or Fault Active                         |                       |                |
|                               |               |                                  |                                    | Disable Conditions: | MIL not Illuminated for DTC's:                  | TCM: P0815, P0826, P182E, P1876, P1877, P1915, P1761<br>ECM: None |                       |                |
| Tap Up Tap Down Switch (TUTD) | P0826         | Up and Down Shift Switch Circuit | TUTD Circuit Reads Invalid Voltage | = TRUE Boolean      |   |   | >= 60 Fail Time (Sec) | Special No MIL |
|                               |               |                                  |                                    |                     | Ignition Voltage Lo                             | >= 8.599609 Volts   |                       |                |
|                               |               |                                  |                                    |                     | Ignition Voltage Hi                             | <= 31.99902 Volts   |                       |                |
|                               |               |                                  |                                    |                     | Engine Speed Lo                                 | >= 400 RPM  |                       |                |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria                                       | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|---|---|--------------------|---|---|--|---------------|
|                               |               |   |   |                    | Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br>P0826 Status is<br><br>MIL not Illuminated for DTC's:   | <= 7500 RPM<br><br>>= 5 Sec<br><br>≠ Test Failed This Key On or Fault Active<br><br>TCM: P1761<br>ECM: None |  |               |
| Variable Bleed Solenoid (VBS) | P0961         | Pressure Control (PC) Solenoid A Control Circuit Rationality Test (Line Pressure VBS) | The HWIO reports an invalid voltage (out of range) error flag | = TRUE Boolean     |   |   | >= 4.4 Fail Time (Sec)<br><br>out of 5 Sample Time (Sec) | Two Trips     |
|                               |               |   |   |                    | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec |   |  |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required  | Mil<br>Illum. |
|----------------------------------|---------------|---|---|--------------------|--|------------------------|---|---------------|
|                                  |               |   |   |                    | MIL not Illuminated for<br>DTC's:  | TCM: None<br>ECM: None |   |               |
| Variable Bleed<br>Solenoid (VBS) | P0962         | Pressure Control (PC)<br>Solenoid A Control<br>Circuit Low Voltage<br>(Line Pressure VBS) | The HWIO reports<br>a low voltage<br>(ground short) error<br>flag | = TRUE Boolean     |  |                        | >= 1.5 Fail Time<br>(Sec)<br><br>out 1.875 Sample<br>of Time<br>(Sec) | One<br>Trip   |
|                                  |               |   |   |                    | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the<br>allowable limits for >= 5 Sec |                        |   |               |
|                                  |               |   |   |                    | MIL not Illuminated for<br>DTC's:  | TCM: None<br>ECM: None |   |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|----------------------------------|---------------|--|---|--------------------|--|---|---|---------------|
| Variable Bleed<br>Solenoid (VBS) | P0963         | Pressure Control (PC)<br>Solenoid A Control<br>Circuit High Voltage<br>(Line Pressure VBS) | The HWIO reports<br>a high voltage<br>(open or power<br>short) error flag | = TRUE Boolean     |  |   | >= 4.4 Fail Time<br>(Sec)<br><br>out of 5 Sample<br>Time<br>(Sec) | Two<br>Trips  |
|                                  |               |  |   |                    | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the<br>allowable limits for >= 5 Sec | Disable<br>Condi<br>tion<br>s:<br>MIL not illuminated for<br>DTC's:<br>TCM: None<br>ECM: None |   |               |
| Variable Bleed<br>Solenoid (VBS) | P0966         | Pressure Control (PC)<br>Solenoid B Control<br>Circuit Low Voltage<br>(C35R VBS)           | The HWIO reports<br>a low voltage<br>(ground short) error<br>flag         | = TRUE Boolean     |  |   | >= 0.3 Fail Time<br>(Sec)   | One<br>Trip   |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|--|--|--------------------|---|----------------------|--|---------------|
|                               |               |  |  |                    |   |                      | out 0.375 Sample<br>of Time<br>(Sec)                           |               |
|                               |               |  |  |                    | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br>P0966 Status is not = Test Failed This Key On or Fault Active<br>Disable Condition s: MIL not Illuminated for DTC's: TCM: None ECM: None |                      |  |               |
| Variable Bleed Solenoid (VBS) | P0967         | Pressure Control (PC) Solenoid B Control Circuit High Voltage (C35R VBS) | The HWIO reports a high voltage (open or power short) error flag | = TRUE Boolean     |   |                      | >= 0.3 Fail Time (Sec)<br>out 0.375 Sample<br>of Time<br>(Sec) | One Trip      |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria                                  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|--|--|--------------------|---|----------------------|--|---------------|
|                               |               |  |  |                    | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br>P0967 Status is not = Test Failed This Key On or Fault Active<br>MIL not Illuminated for DTC's: TCM: None<br>ECM: None<br>Disable Condition s: |                      |  |               |
| Variable Bleed Solenoid (VBS) | P0970         | Pressure Control (PC) Solenoid C Control Circuit Low Voltage (C456/CBR1 VBS) | The HWIO reports a low voltage (ground short) error flag | = TRUE Boolean     |   |                      | >= 0.3 Fail Time (Sec)<br>ou t 0.375 Sample Time (Sec)<br>of | One Trip      |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required  | Mil<br>Illum. |
|-------------------------------|---------------|---|--|--------------------|--|--|---|---------------|
|                               |               |   |  |                    | P0970 Status is not<br><br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the allowable limits for<br><br>Disa<br>ble<br>Con<br>diti<br>on<br>s: | Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active<br><br>=<br><br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |   |               |
| Variable Bleed Solenoid (VBS) | P0971         | Pressure Control (PC) Solenoid C Control Circuit High Voltage (C456/CBR1 VBS) | The HWIO reports a high voltage (open or power short) error flag | = TRUE Boolean     |  |  | >= 0.3 Fail Time (Sec)<br><br>ou<br>t 0.375 Sample Time (Sec)<br>of | One Trip      |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description                        | Malfunction<br>Criteria                                  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|--|--|--------------------|---|---|---|---------------|
|                      |               |  |  |                    | P0971 Status is not<br><br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the allowable limits for<br><br><b>Disa<br/>ble<br/>Condi<br/>tion<br/>s:</b> | Test Failed This Key On or Fault Active<br>=<br><br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |   |               |
| Shift Solinoid       | P0973         | Shift Solenoid A Control Circuit Low (Mode 2 Solenoid) | The HWIO reports a low voltage (ground short) error flag | = TRUE Boolean     |   |   | >= 1.2 Fail Time (Sec)<br><br>ou<br>t<br>of 1.5 Sample Time (Sec) | One Trip      |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description                         | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---|--|--------------------|--|--|---|---------------|
|                      |               |   |  |                    | P0973 Status is not<br><br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the allowable limits for<br><br><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b> | = Test Failed This Key On or Fault Active<br><br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |   |               |
| Shift Solinoid       | P0974         | Shift Solenoid A Control Circuit High (Mode 2 Solenoid) | The HWIO reports a high voltage (open or power short) error flag | = TRUE Boolean     |  |  | >= 1.2 Fail Time (Sec)<br><br>ou<br>t<br>of 1.5 Sample Time (Sec) | Two Trips     |

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MAIN SECTION

| Component/<br>System      | Fault<br>Code | Monitor Strategy<br>Description                               | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required                        | Mil<br>Illum. |
|---------------------------|---------------|---|---|--------------------|--|--|---|---------------|
|                           |               |   |   |                    | P0974 Status is not<br><br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the<br>allowable limits for<br><br><b>Disa<br/>ble<br/>Condi<br/>tion<br/>s:</b> | Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active<br><br>=<br><br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |   |               |
| Mode 3 Multiplex<br>Valve | P0977         | Shift Solenoid B Control<br>Circuit High<br>(Mode 3 Solenoid) | The HWIO reports<br>a high voltage<br>(open or power<br>short) error flag | = TRUE Boolean     |  |  | >= 1.2 Sec<br><br>ou<br>t<br>of 1.5 Sec | One<br>Trip   |

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                       | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required                                 | Mil<br>Illum.  |
|-------------------------------|---------------|---|---|--------------------|---|---|--|----------------|
|                               |               |   |   |                    | P0977 Status is not<br><br>Ignition Voltage<br>Ignition Voltage<br>Engine Speed<br>Engine Speed<br>Engine Speed is within the allowable limits for<br><br><b>Disa<br/>ble<br/>Condi<br/>tion<br/>s:</b> | Test Failed This Key On or Fault Active<br>=<br><br>>= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |  |                |
| Tap Up Tap Down Switch (TUTD) | P1761         | Tap Up and Down switch signal circuit (rolling count) | Rolling count value received from BCM does not match expected value | = TRUE Boolean     |   |   | >= 3 Fail Counter<br><br>> 10 Sample Timer (Sec) | Special No MIL |
|                               |               |   |   |                    | Tap Up Tap Down Message Health  | = TRUE Boolean  |  |                |

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| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum.     |
|----------------------------------|---------------|---------------------------------|--|--|---|---|------------------|-------------------|
|                                  |               |                                 |  |  | Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b> | >= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>TCM: None<br>ECM: None |                  |                   |
| Tap Up Tap Down<br>Switch (TUTD) | P1765         | Upshift Switch Circuit<br>#2    | <u>Fail<br/>Case</u><br>1 Tap Up Switch<br>Stuck in the Up<br>Position in Range 1<br>Enabled<br><br>Tap Up Switch<br>Stuck in the Up<br>Position in Range 2<br>Enabled<br><br>Tap Up Switch<br>Stuck in the Up<br>Position in Range 3<br>Enabled<br><br>Tap Up Switch<br>Stuck in the Up<br>Position in Range 4<br>Enabled | = 0 Boole<br>an<br><br>= 0 Boole<br>an<br><br>= 0 Boole<br>an<br><br>= 0 Boole<br>an |   |   |                  | Special<br>No MIL |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required        | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|-------------------------|---------------|
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 5<br>Enabled | = 0 Boolean        |                          |                      |                         |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 6<br>Enabled | = 0 Boolean        |                          |                      |                         |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Neutral<br>Enabled | = 1 Boolean        |                          |                      |                         |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Park<br>Enabled    | = 1 Boolean        |                          |                      |                         |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Reverse<br>Enabled | = 0 Boolean        |                          |                      |                         |               |
|                      |               |                                 | Tap Up Switch ON   | = TRUE Boolean     |                          |                      | >= 1 Fail Time<br>(Sec) |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | <u>Fail</u><br><u>Case</u><br><u>2</u><br>Tap Up Switch<br>Stuck in the Up<br>Position in Range 1<br>Enabled | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 2<br>Enabled   | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 3<br>Enabled   | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 4<br>Enabled   | = 1                | Boole<br>an              |                      |                  |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 5<br>Enabled   | = 1                | Boole<br>an              |                      |                  |               |

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| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction        | Enable<br>Conditions         | Time<br>Required          | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|---------------------------------|------------------------------|---------------------------|---------------|
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Range 6<br>Enabled | = 1 Boolean        |                                 |                              |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Neutral<br>Enabled | = 0 Boolean        |                                 |                              |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Park<br>Enabled    | = 0 Boolean        |                                 |                              |                           |               |
|                      |               |                                 | Tap Up Switch<br>Stuck in the Up<br>Position in Reverse<br>Enabled | = 0 Boolean        |                                 |                              |                           |               |
|                      |               |                                 | Tap Up Switch ON   | = TRUE Boolean     |                                 |                              |                           |               |
|                      |               |                                 | NOTE: Both<br>Failcase1 and<br>Failcase 2 Must Be<br>Met           |                    |                                 |                              | >= 600 Fail Time<br>(Sec) |               |
|                      |               |                                 |  |                    | Time Since Last Range<br>Change | >= 1 Enable<br>Time<br>(Sec) |                           |               |
|                      |               |                                 |  |                    | Ignition Voltage Lo             | >= 8.599609 Volts            |                           |               |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value             | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum.  |
|-------------------------------|---------------|---------------------------------|---|--------------------------------|---|---|------------------|----------------|
|                               |               |                                 |   |                                | Ignition Voltage Hi<br>Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br>P1765 Status is<br><br>MIL not Illuminated for DTC's: | <= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>Test Failed This Key On or Fault Active<br><br>TCM: P1767, P1761, P182E, P1915<br>ECM: None |                  |                |
| Tap Up Tap Down Switch (TUTD) | P1766         | Downshift Switch Circuit #2     | <u>Fail Case</u> Tap Down Switch Stuck in the Down Position in Range 1 Enabled<br><br>Tap Down Switch Stuck in the Down Position in Range 2 Enabled | = 0 Boolean<br><br>= 0 Boolean |   |   |                  | Special No MIL |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 3<br>Enabled       | = 0 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 4<br>Enabled       | = 0 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 5<br>Enabled       | = 0 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 6<br>Enabled       | = 0 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range<br>Neutral Enabled | = 1 Boolean        |                          |                      |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range<br>Park Enabled                            | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range<br>Reverse Enabled                         | = 0 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>ON  | = TRUE Boolean     |                          |                      | >= 1 sec         |               |
|                      |               |                                 | <u>Fail<br/>Case<br/>2</u><br>Tap Down Switch<br>Stuck in the Down<br>Position in Range 1<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 2<br>Enabled                               | = 1 Boolean        |                          |                      |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 3<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 4<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 5<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Range 6<br>Enabled | = 1 Boolean        |                          |                      |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Neutral<br>Enabled | = 0 Boolean        |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction                           | Enable<br>Conditions                                     | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--|--|------------------|---------------|
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Park<br>Enabled    | = 0 Boolean        |  |  |                  |               |
|                      |               |                                 | Tap Down Switch<br>Stuck in the Down<br>Position in Reverse<br>Enabled | = 0 Boolean        |  |  |                  |               |
|                      |               |                                 | Tap Down Switch<br>ON  | = TRUE Boolean     |  |  |                  |               |
|                      |               |                                 | NOTE: Both<br>Failcase1 and<br>Failcase 2 Must Be<br>Met               |                    |  |  | >= 600 sec       |               |
|                      |               |                                 |  |                    | Time Since Last Range<br>Change                    | >= 1 Sec   |                  |               |
|                      |               |                                 |  |                    | Ignition Voltage Lo                                | >= 8.599609 Volts  |                  |               |
|                      |               |                                 |  |                    | Ignition Voltage Hi                                | <= 18 Volts  |                  |               |
|                      |               |                                 |  |                    | Engine Speed Lo                                    | >= 400 RPM   |                  |               |
|                      |               |                                 |  |                    | Engine Speed Hi                                    | <= 7500 RPM  |                  |               |
|                      |               |                                 |  |                    | Engine Speed is within the<br>allowable limits for | >= 5 Sec   |                  |               |
|                      |               |                                 |  |                    | P1766 Status is                                    | ≠ Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description         | Malfunction<br>Criteria                        | Threshold<br>Value                              | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required         | Mil<br>Illum.     |
|----------------------------------|---------------|---|--|---|---|---|--------------------------|-------------------|
|                                  |               |   |  |   | MIL not Illuminated for<br>DTC's:   | TCM: P1767, P1761,<br>P182E, P1915<br><br>ECM: None   |                          |                   |
| Tap Up Tap Down<br>Switch (TUTD) | P1767         | Up and Down Shift<br>Switch Circuit #2  | TUTD Circuit<br>Reads Invalid<br>Voltage       | = TRUE Boolean                                  |   |   | >= 60 Fail Time<br>(Sec) | Special<br>No MIL |
|                                  |               |   |  |   | Ignition Voltage Lo<br>Ignition Voltage Hi<br>Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the<br>allowable limits for<br><br>P1767 Status is | >= 8.599609 Volts<br><= 31.99902 Volts<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                          |                   |
| Internal Mode<br>Switch (IMS)    | P182E         | Internal Mode Switch -<br>Invalid Range | <u>Fail<br/>Case</u><br>1<br><br>Current range | = Transition<br>1 (bit state<br>1110) Rang<br>e | MIL not Illuminated for<br>DTC's:   | TCM: P1761<br><br>ECM: None   |                          | One<br>Trip       |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                   | Threshold<br>Value                     | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |      |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|------------------|---------------|------|
|                      |               |                                 | Previous range  | ≠ CeTRGR_e Rang<br>_PRNDL_ e<br>Drive6 |                          |                      |                  |               |      |
|                      |               |                                 | Previous range  | ≠ CeTRGR_e Rang<br>_PRNDL_ e<br>Drive5 |                          |                      |                  |               |      |
|                      |               |                                 | Range Shift State   | = Range Shift<br>Completed             | ENU<br>M                 |                      |                  |               |      |
|                      |               |                                 | Absolute Attained<br>Gear Slip                            | <= 50 rpm                              |                          |                      |                  |               |      |
|                      |               |                                 | Attained Gear   | <= Sixth                               |                          |                      |                  |               |      |
|                      |               |                                 | Attained Gear   | >= First                               |                          |                      |                  |               |      |
|                      |               |                                 | Throttle Position<br>Available                            | = TRUE                                 |                          |                      |                  |               |      |
|                      |               |                                 | Throttle Position   | >= 8.0001831 pct                       |                          |                      |                  |               |      |
|                      |               |                                 | Output Speed  | >= 200 rpm                             |                          |                      |                  |               |      |
|                      |               |                                 | Engine Torque   | >= 50 Nm                               |                          |                      |                  |               |      |
|                      |               |                                 | Engine Torque   | <= 8191.75 Nm                          |                          |                      |                  |               |      |
|                      |               |                                 | If the above conditions are met then Increment Fail Timer |  |                          |                      |                  | >= 1 Seconds  | Fail |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value                         | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required    | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|---------------------|---------------|
|                      |               |                                 | If Fail Timer has<br>Expired then<br>Increment Fail<br>Counter          |  |                          |                      | >= 5 Fail<br>Counts |               |
|                      |               |                                 | <u>Fail<br/>Case</u><br>2   | Output Speed <= 70 rpm                     |                          |                      |                     |               |
|                      |               |                                 | The following<br>PRNDL sequence<br>events occur in this<br>exact order: |  |                          |                      |                     |               |
|                      |               |                                 | PRNDL state =   | Drive 6 (bit Rang<br>state 0110) e         |                          |                      |                     |               |
|                      |               |                                 | PRNDL state =<br>Drive 6 for  | >= 1 Sec                                   |                          |                      |                     |               |
|                      |               |                                 | PRNDL state =   | Transition Rang<br>8 (bit state e<br>0111) |                          |                      |                     |               |
|                      |               |                                 | PRNDL state =   | Drive 6 (bit Rang<br>state 0110) e         |                          |                      |                     |               |
|                      |               |                                 | PRNDL state =   | Transition Rang<br>1 (bit state e<br>1110) |                          |                      |                     |               |
|                      |               |                                 | Above sequencing<br>occurs in   | <= 1 Sec                                   |                          |                      |                     |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value                     | Secondary<br>Malfunction        | Enable<br>Conditions     | Time<br>Required | Mil<br>Illum.   |
|----------------------|---------------|---------------------------------|--|--|---------------------------------|--------------------------|------------------|-----------------|
|                      |               |                                 | Neutral Idle Mode  | = Inactive                             |                                 |                          |                  |                 |
|                      |               |                                 | If all conditions above are met<br>Increment delay<br>Timer    |  |                                 |                          |                  |                 |
|                      |               |                                 | If the below two conditions are met<br>Increment Fail<br>Timer |  |                                 |                          | >= 3             | Fail<br>Seconds |
|                      |               |                                 | delay timer  | >= 1 Sec                               |                                 |                          |                  |                 |
|                      |               |                                 | Input Speed  | >= 400 Sec                             |                                 |                          |                  |                 |
|                      |               |                                 | If Fail Timer has Expired then<br>Increment Fail<br>Counter    |  |                                 |                          | >= 2             | Fail<br>Counts  |
|                      |               |                                 | <u>Fail Case 3</u>   |  |                                 |                          |                  |                 |
|                      |               |                                 | Current range  | = Transition 13 (bit state 0010) Range | Previous range                  | ≠ CeTRGR_e_PRND L_Drive5 |                  |                 |
|                      |               |                                 | Engine Torque  | >= -8192 Nm                            | Previous range                  | ≠ CeTRGR_e_PRND L_Drive5 |                  |                 |
|                      |               |                                 | Engine Torque  | <= 8191.75 Nm                          | IMS is 7 position configuration | = 0 Boolean              |                  |                 |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value                           | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required                                       | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--|----------------------|--|---------------|
|                      |               |                                 | <p>If the above conditions are met then, Increment Fail Timer</p> <p>If Fail Timer has Expired then Increment Fail Counter</p> |  | <p>If the "IMS 7 Position config" = 1 then the "previous range" criteria above must also be satisfied when the "current range" = "Transition 13"</p> |                      | <p>&gt;= 0.225 Seconds</p> <p>&gt;= 15 Fail Counts</p> |               |
|                      |               |                                 | <p><u>Fail Case 4</u></p> <p>Current range</p>   | <p>= Transition 8 (bit state 0111) Range</p> | <p>Disable Fail Case 4 if last positive range was Drive 6 and current range is transition 8</p>  |                      |  |               |
|                      |               |                                 | <p>Inhibit bit (see definition)</p>  | <p>= FALSE</p>                               | <p>Set inhibit bit true if PRNDL = 1100 (rev) or 0100 (Rev-Neu transition 11)</p> <p>Set inhibit bit false if PRNDL = 1001 (park)</p>                |                      |  |               |
|                      |               |                                 | <p>Steady State Engine Torque</p>  | <p>&gt;= 30 Nm</p>                           |  |                      |  |               |
|                      |               |                                 | <p>Steady State Engine Torque</p>  | <p>&lt;= 8191.75 Nm</p>                      |  |                      |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value                         | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|-------------------|---------------|
|                      |               |                                 | If the above conditions are met then Increment Fail Timer      |  |                          |                      | >= 0.225 Seconds  |               |
|                      |               |                                 | If the above Conditions have been met, Increment Fail Counter  |  |                          |                      | >= 15 Fail Counts |               |
|                      |               |                                 | <u>Fail Case 5</u>   | Throttle Position Available = TRUE Boolean |                          |                      |                   |               |
|                      |               |                                 | The following PRNDL sequence events occur in this exact order: |  |                          |                      |                   |               |
|                      |               |                                 | PRNDL State  | = Reverse (bit state 1100) Range           |                          |                      |                   |               |
|                      |               |                                 | PRNDL State  | = Transition 11 (bit state 0100) Range     |                          |                      |                   |               |
|                      |               |                                 | PRNDL State  | = Neutral (bit state 0101) Range           |                          |                      |                   |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                                    | Threshold<br>Value                         | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|---|----------------------|------------------|---------------|
|                      |               |                                 | PRNDL State  | = Transition Range<br>11 (bit state 0100)  |   |                      |                  |               |
|                      |               |                                 | Above sequencing occurs in                                 | <= 1 Sec                                   |   |                      |                  |               |
|                      |               |                                 | Then delay timer increments                                |  |   |                      |                  |               |
|                      |               |                                 | Delay timer  | >= 5 sec                                   |   |                      |                  |               |
|                      |               |                                 | Range Shift State  | = Range Shift Complete                     |   |                      |                  |               |
|                      |               |                                 | Absolute Attained Gear Slip                                | <= 50 rpm                                  |   |                      |                  |               |
|                      |               |                                 | Attained Gear  | <= Sixth                                   |   |                      |                  |               |
|                      |               |                                 | Attained Gear  | >= First                                   |   |                      |                  |               |
|                      |               |                                 | Throttle Position  | >= 8.0001831 pct                           |   |                      |                  |               |
|                      |               |                                 | Output Speed   | >= 200 rpm                                 |   |                      |                  |               |
|                      |               |                                 | If the above conditions are met<br>Increment Fail<br>Timer |  |   |                      | >= 20 Seconds    |               |
|                      |               |                                 | <u>Fail Case 6</u><br>Current range                        | = Illegal (bit state 0000 or 1000 or 0001) | A Open Circuit Definition (flag set false if the following conditions are met): |                      |                  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value  | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required          | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|---|---|---|---------------------------|---------------|
|                      |               |                                 | <p>and</p> <p>A Open Circuit<br/>(See Definition)</p>                                       | <p>= FALSE Boolean</p>  | <p>Current Range</p> <p>or</p> <p>Last positive state</p> <p>or</p> <p>Previous transition state</p> <p>Fail case 5 delay timer</p> | <p>Transition 11 (bit state 0100) ≠</p> <p>Neutral (bit state 0101) ≠</p> <p>Transition 8 (bit state 0111) ≠</p> <p>= 0 sec</p> | <p>&gt;= 6.25 Seconds</p> |               |
|                      |               |                                 | <p><u>Fail Case 7</u></p> <p>Current PRNDL State</p> <p>and</p> <p>Previous PRNDL state</p> | <p>= PRNDL circuit ABCP = 1101</p> <p>= PRNDL circuit ABCP = 1111</p> | <p>Range</p> <p>Range</p>   |   |                           |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Input Speed  | >= 150 RPM         |                          |                      |                  |               |
|                      |               |                                 | Reverse Trans Ratio  | <= 2.9759521 ratio |                          |                      |                  |               |
|                      |               |                                 | Reverse Trans Ratio  | >= 3.4239502 ratio |                          |                      |                  |               |
|                      |               |                                 | If the above Conditions are met then, Increment Fail timer             |                    |                          |                      | >= 6.25 Seconds  |               |
|                      |               |                                 | P182E will report test fail when any of the above 7 fail cases are met |                    |                          |                      |                  |               |
|                      |               |                                 | Ignition Voltage Lo  | >= 8.599609 Volts  |                          |                      |                  |               |
|                      |               |                                 | Ignition Voltage Hi  | <= 31.99902 Volts  |                          |                      |                  |               |
|                      |               |                                 | Engine Speed Lo  | >= 400 RPM         |                          |                      |                  |               |
|                      |               |                                 | Engine Speed Hi  | <= 7500 RPM        |                          |                      |                  |               |
|                      |               |                                 | Engine Speed is within the allowable limits for                        | >= 5 Sec           |                          |                      |                  |               |
|                      |               |                                 | Engine Torque Signal Valid   | = TRUE Boolean     |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description          | Malfunction<br>Criteria         | Threshold<br>Value                 | Secondary<br>Malfunction          | Enable<br>Conditions   | Time<br>Required     | Mil<br>Illum.     |
|----------------------------------|---------------|--|---------------------------------|------------------------------------|-----------------------------------|--|----------------------|-------------------|
|                                  |               |  |                                 |                                    | MIL not Illuminated for<br>DTC's: | TCM: P0716, P0717,<br>P0722, P0723, P07C0,<br>P07BF, P077C, P077D<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                      |                   |
| Tap Up Tap Down<br>Switch (TUTD) | P1876         | Tap Up and Down<br>Enable Switch Circuit | Current range                   | = Park or Reverse or Neutral State |                                   |  | >= 3 Fail Time (Sec) | Special<br>No MIL |
|                                  |               |  | TUTD Enable<br>Switch is Active | = TRUE Boolean                     |                                   |  | >= 5 Fail Counts     |                   |
|                                  |               |  |                                 |                                    | Ignition Voltage Lo               | >= 8.599609 Volts  |                      |                   |
|                                  |               |  |                                 |                                    | Ignition Voltage Hi               | <= 31.99902 Volts  |                      |                   |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction   | Enable<br>Conditions   | Time<br>Required                   | Mil<br>Illum. |
|-------------------------------|---------------|---|---|--|--|--|------------------------------------|---------------|
|                               |               |   |   |  | Vehicle Speed Lo<br>Engine Speed Lo<br>Engine Speed Hi<br>Engine Speed is within the allowable limits for<br><br>P1876 Status is | <= 511 KPH<br>>= 400 RPM<br><= 7500 RPM<br>>= 5 Sec<br><br>≠ Test Failed This Key On or Fault Active |                                    |               |
|                               |               |   |   |  | Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's:  | TCM: P0815, P0816,<br>P0826, P1761, P1825,<br>P1877, P1915, U0100<br>ECM: None                       |                                    |               |
| Internal Mode<br>Switch (IMS) | P1915         | Internal Mode Switch<br>Does Not Indicate<br>Park/Neutral (P/N)<br>During Start | PRNDL State is<br><br>The following<br>events must occur<br>Sequentially<br><br>Initial Engine<br>speed | ≠ Park or<br>Neutral<br><br>Enumeratio<br>n<br><br><= 50 RPM |  |  | >= 0.25<br>Enable<br>Time<br>(Sec) | One<br>Trip   |
|                               |               |   | Then<br><br>Engine Speed<br>Between Following<br>Cals   |  |  |  |                                    |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria           | Threshold<br>Value | Secondary<br>Malfunction                                 | Enable<br>Conditions  | Time<br>Required                 | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-----------------------------------|--------------------|--|---|----------------------------------|---------------|
|                      |               |                                 | Engine Speed Lo<br>Hist           | >= 50 RPM          |  |   | >= 0.069 Enable<br>Time<br>(Sec) |               |
|                      |               |                                 | Engine Speed Hi<br>Hist           | <= 480 RPM         |  |   |                                  |               |
|                      |               |                                 | Then                              |                    |  |   | >= 1.25 Fail Time<br>(Sec)       |               |
|                      |               |                                 | Final Engine<br>Speed             | >= 525 RPM         |  |   |                                  |               |
|                      |               |                                 | Final Transmission<br>Input Speed | >= 100 RPM         |  |   |                                  |               |
|                      |               |                                 |                                   |                    | DTC has Ran this Key<br>Cycle?                           | = FALSE Boolean   |                                  |               |
|                      |               |                                 |                                   |                    | Ignition Voltage Lo                                      | >= 6 V  |                                  |               |
|                      |               |                                 |                                   |                    | Ignition Voltage Hi                                      | <= 31.99902 V   |                                  |               |
|                      |               |                                 |                                   |                    | Ignition Voltage Hyst High<br>(enables above this value) | >= 5 V  |                                  |               |
|                      |               |                                 |                                   |                    | Ignition Voltage Hyst Low<br>(disabled below this value) | <= 2 V  |                                  |               |
|                      |               |                                 |                                   |                    | Transmission Output<br>Speed                             | <= 90 rpm   |                                  |               |
|                      |               |                                 |                                   |                    | P1915 Status is  | ≠<br>Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active |                                  |               |



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MAIN SECTION

| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description                      | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction                 | Enable<br>Conditions           | Time<br>Required                   | Mil<br>Illum. |
|---|---------------|--|--|--------------------|--|--------------------------------|------------------------------------|---------------|
|   |               |  |  |                    | MIL not Illuminated for<br>DTC's:        | TCM: P0722, P0723<br>ECM: None |                                    |               |
| Transmission<br>Control Module<br>(TCM) | P2534         | Ignition Switch<br>Run/Start Position<br>Circuit Low | TCM Run crank<br>active (based on<br>voltage thresholds<br>below)                  | = FALSE Boolean    |  |                                |                                    |               |
|   |               |  | Ignition Voltage<br>High Hyst (run<br>crank goes true<br>when above this<br>value) | 5 Volts            |  | >= 280                         | Fail<br>Counts<br>(25ms<br>loop)   |               |
|   |               |  | Ignition Voltage<br>Low Hyst (run<br>crank goes false<br>when below this<br>value) | 2 Volts            |  | Out<br>of 280                  | Sample<br>Counts<br>(25ms<br>loop) |               |
|   |               |  |  |                    | ECM run/crank active<br>status available | = TRUE Boolean                 |                                    |               |
|   |               |  |  |                    | ECM run/crank active<br>status           | = TRUE Boolean                 |                                    |               |
|   |               |  |  |                    | MIL not Illuminated for<br>DTC's:        | TCM: None<br>ECM: None         |                                    | One<br>Trip   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                    | Fault<br>Code | Monitor Strategy<br>Description                         | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction                      | Enable<br>Conditions                       | Time<br>Required                                    | Mil<br>Illum. |
|---|---------------|---|--|--------------------|---|--|---|---------------|
| Transmission<br>Control Module<br>(TCM) | P2535         | Ignition Switch<br>Run/Start Position<br>Circuit High   | TCM Run crank<br>active (based on<br>voltage thresholds<br>below)                  | = TRUE Boolean     |   |  |   | One<br>Trip   |
|   |               |   | Ignition Voltage<br>High Hyst (run<br>crank goes true<br>when above this<br>value) | 5 Volts            |   | >= 280<br>Fail<br>Counts<br>(25ms<br>loop) |   |               |
|   |               |   | Ignition Voltage<br>Low Hyst (run<br>crank goes false<br>when below this<br>value) | 2 Volts            |   |  | Out<br>of 280<br>Sample<br>Counts<br>(25ms<br>loop) |               |
|   |               |   |  |                    | ECM run/crank active<br>status available      | = TRUE Boolean                             |   |               |
|   |               |   |  |                    | ECM run/crank active<br>status                | = FALSE Boolean                            |   |               |
|   |               |   |  |                    | <b>Disa<br/>ble<br/>Con<br/>diti<br/>ons:</b> | TCM: None<br>ECM: None                     |   |               |
| Variable Bleed<br>Solenoid (VBS)        | P2714         | Pressure Control (PC)<br>Solenoid D Stuck Off<br>[CB26] | <u>Fail<br/>Case</u><br>1 Case: Steady State<br>2nd Gear                           |                    |   |  |   | One<br>Trip   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria               | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum.         |
|----------------------|---------------|---------------------------------|---------------------------------------|---|--------------------------|----------------------|--|-----------------------|
|                      |               |                                 | Gear slip                             | >= 400 RPM  |                          |                      | Please See Table Neutral Timer (Sec)<br>>= 5 For Neutra I Time Cal |                       |
|                      |               |                                 | Intrusive test:<br>commanded 3rd gear |   |                          |                      |  |                       |
|                      |               |                                 | If attained Gear = 3rd for Time       | >= Table Based Time<br>Please see Table 2 in Supporting Documents |                          |                      | Enable Time (Sec)  |                       |
|                      |               |                                 | If Above Conditions have been met     |   |                          |                      |  |                       |
|                      |               |                                 | Increment 2nd gear fail count         |   |                          |                      | >= 3   | 2nd Gear Fail Count   |
|                      |               |                                 | and CB26 Fail Count                   |   |                          |                      | >= 14  | or<br>CB26 Fail Count |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p><u>Fail</u><br/><u>Case</u><br/><u>2</u> Case: Steady State<br/>6th Gear</p> <p>Gear slip</p> <p>Intrusive test:<br/>commanded 5th<br/>gear</p> <p>If attained Gear =<br/>5th For Time</p> | <p>&gt;= 400 RPM</p> <p>&gt;=</p> <p>Table<br/>Based<br/>Time<br/>Enable<br/>Time<br/>(Sec)<br/>Please see<br/>Table 2 in<br/>Supporting<br/>Documents</p> |                          |                      | <p>Please<br/>See<br/>Table<br/>5 For<br/>Neutra<br/>l Time<br/>Cal</p> <p>Neutral<br/>Timer<br/>(Sec)</p> |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction        | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|---------------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If Above Conditions<br/>have been met,<br/>Increment 5th gear<br/>fail counter</p> <p>and CB26 Fail<br/>Count</p> |                    |                                 |                      | <p>&gt;= 3 5th Gear<br/>Fail Count</p> <p>or</p> <p>&gt;= 14 CB26 Fail<br/>Count</p> |               |
|                      |               |                                 |  |                    | PRNDL State defaulted           | = FALSE Boolean      |  |               |
|                      |               |                                 |  |                    | inhibit RVT                     | = FALSE Boolean      |  |               |
|                      |               |                                 |  |                    | IMS fault pending<br>indication | = FALSE Boolean      |  |               |
|                      |               |                                 |  |                    | TPS validity flag               | = TRUE Boolean       |  |               |
|                      |               |                                 |  |                    | Hydraulic System<br>Pressurized | = TRUE Boolean       |  |               |
|                      |               |                                 |  |                    | Minimum output speed for<br>RVT | >= 0 RPM             |  |               |
|                      |               |                                 |  |                    | A OR B                          |                      |  |               |
|                      |               |                                 |  |                    | (A) Output speed enable         | >= 67 RPM            |  |               |
|                      |               |                                 |  |                    | (B) Accelerator Pedal<br>enable | >= 0.500488 Pct      |  |               |
|                      |               |                                 |  |                    | Common Enable Criteria          |                      |  |               |
|                      |               |                                 |  |                    | Ignition Voltage Lo             | >= 8.599609 Volts    |  |               |
|                      |               |                                 |  |                    | Ignition Voltage Hi             | <= 31.99902 Volts    |  |               |
|                      |               |                                 |  |                    | Engine Speed Lo                 | >= 400 RPM           |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                        | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|---|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Engine Speed Hi                                 | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal valid                  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | HSD Enabled                                     | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                  | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                       | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present              | = TRUE               |                  |               |

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description                                  | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction          | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|----------------------------------|---------------|--|---|--|-----------------------------------|--|------------------|---------------|
|                                  |               |  |   | Disable<br>Condition<br>s:   | MIL not illuminated for<br>DTC's: | TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Variable Bleed<br>Solenoid (VBS) | P2715         | Pressure Control (PC)<br>Solenoid D Stuck On<br>[CB26] (Dynamic) | Primary Offgoing<br>Clutch is<br>exhausted (See<br>Table 13 in<br>Supporting<br>Documents for<br>Exhaust Delay<br>Timers)<br><br>Primary Oncoming<br>Clutch Pressure<br>Command Status<br><br>Primary Offgoing<br>Clutch Pressure<br>Command Status | = TRUE Boolean<br><br>= Maximum<br>pressurized<br><br>= Clutch<br>exhaust<br>command |                                   |  |                  | One<br>Trip   |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value                | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|-----------------------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Range Shift Status   | ≠<br>Initial<br>Clutch<br>Control |                          |                      |                  |               |
|                      |               |                                 | Attained Gear Slip   | <=<br>40<br>RPM                   |                          |                      |                  |               |
|                      |               |                                 | If above coditons are true, increment appropriate Fail 1 Timers Below: |                                   |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-1 shifting with throttle)                           | >=<br>0.2998047                   | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-1 shifting without throttle)                        | >=<br>0.5                         | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-3 shifting with throttle)                           | >=<br>0.2998047                   | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-3 shifting without throttle)                        | >=<br>0.5                         | Fail<br>Time<br>(Sec)    |                      |                  |               |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                            | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | fail timer 1<br>(2-4 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-4 shifting without<br>throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(6-4 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(6-4 shifting without<br>throttle) | >= 0.5             | Fail<br>Time<br>(Sec)    |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(6-5 shifting with<br>throttle)    | >= 0.2998047       | Fail<br>Time<br>(Sec)    |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value                              | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|---|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>fail timer 1<br/>(6-5 shifting without<br/>throttle)</p> <p>If Attained Gear<br/>Slip is Less than<br/>Above Cal<br/>Increment Fail<br/>Timers</p> <p>If fail timer is<br/>greater than<br/>threshold<br/>increment<br/>corresponding gear<br/>fail counter and<br/>total fail counter</p> | <p>&gt;= 0.5</p> <p>Fail<br/>Time<br/>(Sec)</p> |                          |                      | <p>Total<br/>Fail<br/>Time =<br/>(Fail 1<br/>+ Fail<br/>2) See<br/>Enable<br/>Timers<br/>for Fail<br/>Timer<br/>1, and<br/>Refere<br/>nce<br/>Suppo<br/>rting<br/>Table<br/>15 for<br/>Fail<br/>Timer<br/>2</p> <p>&gt;=                      sec</p> |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.                    |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|----------------------------|----------------------|------------------|----------------------------------|
|                      |               |                                 | 2nd gear fail counter   |                    |                            |                      | >= 3             | Fail Counter From 2nd Gear       |
|                      |               |                                 | 6th gear fail counter   |                    |                            |                      | >= 3             | OR<br>Fail Counter From 6th Gear |
|                      |               |                                 | total fail counter      |                    |                            |                      | >= 5             | OR<br>Total Fail Counter         |
|                      |               |                                 |                         |                    | TUT Enable temperature     | >= -6.65625 °C       |                  |                                  |
|                      |               |                                 |                         |                    | Input Speed Sensor fault   | = FALSE Boolean      |                  |                                  |
|                      |               |                                 |                         |                    | Output Speed Sensor fault  | = FALSE Boolean      |                  |                                  |
|                      |               |                                 |                         |                    | Command / Attained Gear    | ≠ 1st Boolean        |                  |                                  |
|                      |               |                                 |                         |                    | High Side Driver ON        | = TRUE Boolean       |                  |                                  |
|                      |               |                                 |                         |                    | output speed limit for TUT | >= 100 RPM           |                  |                                  |
|                      |               |                                 |                         |                    | input speed limit for TUT  | >= 150 RPM           |                  |                                  |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description                                       | Malfunction<br>Criteria                             | Threshold<br>Value            | Secondary<br>Malfunction            | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|----------------------------------|---------------|---|---|-------------------------------|-------------------------------------|---|------------------|---------------|
|                                  |               |   |   |                               | PRNDL state defaulted               | = FALSE Boolean   |                  |               |
|                                  |               |   |   |                               | IMS Fault Pending                   | = FALSE Boolean   |                  |               |
|                                  |               |   |   |                               | Service Fast Learn Mode             | = FALSE Boolean   |                  |               |
|                                  |               |   |   |                               | HSD Enabled                         | = TRUE Boolean  |                  |               |
|                                  |               |   |   |                               | <b>Disable<br/>Condition<br/>s:</b> | <b>MIL not Illuminated for<br/>DTC's:</b><br>TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Variable Bleed<br>Solenoid (VBS) | P2715         | Pressure Control (PC)<br>Solenoid D Stuck On<br>[CB26] (Steady State) | <u>Fail<br/>Case</u><br>1 Case: Steady State<br>1st | Attained Gear slip >= 400 RPM |                                     |   |                  | One<br>Trip   |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>If the Above is True<br/>for Time</p> <p>Intrusive test:<br/>(CBR1 clutch<br/>exhausted)</p> <p>Gear Ratio</p> <p>Gear Ratio</p> <p>If the above<br/>parameters are<br/>true</p> | <p>Table<br/>Based<br/>Time<br/>Please<br/>Refer to<br/>Table 4 in<br/>supporting<br/>documents</p> <p>&gt;=</p> <p>&lt;= 2.4821777</p> <p>&gt;= 2.2458496</p> |                          |                      | <p>&gt;= 1.1 Fail Timer<br/>(Sec)</p> <p>&gt;= 5 Fail Count<br/>in 1st<br/>Gear<br/>or</p> <p>&gt;= 5 Total Fail<br/>Counts</p> |               |
|                      |               |                                 | <p><u>Fail</u><br/><u>Case</u><br/><u>2</u> Case: Steady State<br/>3rd Gear</p>   |  |                          |                      |   |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 1 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table Based value<br>Please Refer to 3D ec<br>Table 2 in supporting documents<br>>= rpm/s |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table Based Time<br>Please Refer to<br>Table 17 in supporting documents<br>>= Sec         |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | Intrusive test:<br>(C35R clutch<br>exhausted)<br><br>Gear Ratio <= 2.4821777<br><br>Gear Ratio >= 2.2458496<br><br>If the above<br>parameters are<br>true |                    |                          |                      | >= 1.1 Fail Timer<br>(Sec)<br><br>>= 3 Fail Count<br>in 3rd<br>Gear<br>or<br><br>>= 5 Total Fail<br>Counts |               |
|                      |               |                                 | <u>Fail</u><br><u>Case</u><br>3 Case: Steady State<br>4rd Gear  |                    |                          |                      |  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|--|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>Refer to 3D ec<br>Table 1 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>Refer to 3D ec<br>Table 2 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table<br>Based<br>Time<br>Please Sec<br>Refer to<br>Table 17 in<br>supporting<br>documents         |                          |                      |                  |               |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|--|---------------|
|                      |               |                                 | Intrusive test:<br>(C1234 clutch<br>exhausted)<br><br>Gear Ratio <= 0.7003174<br><br>Gear Ratio >= 0.633667<br><br>If the above<br>parameters are<br>true |                    |                          |                      | >= 1.1 Fail Timer<br>(Sec)<br><br>>= 3 Fail Count<br>in 4th<br>Gear<br>or<br><br>>= 5 Total Fail<br>Counts |               |
|                      |               |                                 | <u>Fail</u><br><u>Case</u> Case: Steady State<br>4 5th Gear   |                    |                          |                      |  |               |

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria              | Threshold<br>Value  | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--------------------------------------|---|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Max Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 1 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis | Table<br>Based<br>value<br>Please rpm/s<br>>= Refer to 3D ec<br>Table 2 in<br>supporting<br>documents |                          |                      |                  |               |
|                      |               |                                 | If the Above is True<br>for Time     | Table<br>Based<br>Time<br>Please Sec<br>>= Refer to<br>Table 17 in<br>supporting<br>documents         |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|---|---|--|---------------|
|                      |               |                                 | Intrusive test:<br>(C35R clutch<br>exhausted)<br><br>Gear Ratio <= 0.7003174<br><br>Gear Ratio >= 0.633667<br><br>If the above<br>parameters are<br>true |                    |   |   | >= 1.1 Fail Timer<br>(Sec)<br><br>>= 3 Fail Count<br>in 5th<br>Gear<br>or<br><br>>= 5 Total Fail<br>Counts |               |
|                      |               |                                 |  |                    | PRNDL State defaulted<br><br>inhibit RVT<br><br>IMS fault pending<br>indication<br><br>output speed<br><br>TPS validity flag<br><br>HSD Enabled | = FALSE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>>= 0 RPM<br><br>= TRUE Boolean<br><br>= TRUE Boolean |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                         | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Hydraulic_System_Pressurized                     | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | A OR B   |                      |                  |               |
|                      |               |                                 |                         |                    | (A) Output speed enable                          | >= 67 Nm             |                  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal enable                     | >= 0.500488 Nm       |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo                              | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi                              | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo                                  | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                  | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for  | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Accelerator Pedal enable | >= 5.000305 Pct      |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | >= 5 Nm              |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | <= 8191.875 Nm       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                   | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                         | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present               | = TRUE               |                  |               |

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MAIN SECTION

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description  | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|----------------------------------|---------------|--|---|--------------------|--|---|---|---------------|
|                                  |               |  |   |                    | <p>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</p> <p>MIL not Illuminated for<br/>DTC's:</p> | <p>TCM: P0716, P0717,<br/>P0722, P0723, P182E</p> <p>ECM: P0101, P0102,<br/>P0103, P0106, P0107,<br/>P0108, P0171, P0172,<br/>P0174, P0175, P0201,<br/>P0202, P0203, P0204,<br/>P0205, P0206, P0207,<br/>P0208, P0300, P0301,<br/>P0302, P0303, P0304,<br/>P0305, P0306, P0307,<br/>P0308, P0401, P042E</p> |   |               |
| Variable Bleed<br>Solenoid (VBS) | P2720         | Pressure Control (PC)<br>Solenoid D Control<br>Circuit Low<br>(CB26 VBS) | The HWIO reports<br>a low voltage<br>(ground short) error<br>flag | = TRUE Boole<br>an |  |   | <p>&gt;= 0.3 Fail Time<br/>(Sec)</p> <p>ou<br/>t 0.375 Sample<br/>of Time<br/>(Sec)</p> | One<br>Trip   |
|                                  |               |  |   |                    | <p>P2770 Status is not</p> <p>Ignition Voltage</p>   | <p>= Test<br/>Failed<br/>This Key<br/>On or<br/>Fault<br/>Active</p> <p>&gt;= 8.599609 Volts</p>  |   |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                  | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|--|--|--------------------|--|---|--|---------------|
|                               |               |  |  |                    | Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br><br><b>Disable Condition s:</b> | MIL not Illuminated for DTC's:<br>TCM: None<br>ECM: None  |  |               |
| Variable Bleed Solenoid (VBS) | P2721         | Pressure Control (PC) Solenoid D Control Circuit High (CB26 VBS) | The HWIO reports a high voltage (open or power short) error flag | = TRUE Boolean     |  |   | >= 0.3 Fail Time (Sec)<br><br>out 0.375 Sample Time (Sec) of | One Trip      |
|                               |               |  |  |                    | P2721 Status is not = Test Failed This Key On or Fault Active  | Ignition Voltage >= 8.599609 Volts<br>Ignition Voltage <= 31.99902 Volts<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM |  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description            | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction                           | Enable<br>Conditions   | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|--|---|--|--|------------------------|--|---------------|
|                               |               |  |   |  | Engine Speed is within the allowable limits for    | >= 5 Sec               |  |               |
|                               |               |  |   |  | <b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b> | TCM: None<br>ECM: None |  |               |
| Variable Bleed Solenoid (VBS) | P2723         | Pressure Control (PC) Solenoid E Stuck Off | <p><u>Fail Case</u><br/>1 Case: Steady State 1st Gear</p> <p>Gear slip</p> <p>Intrusive test: commanded 2nd gear</p> <p>If attained Gear ≠ 2nd for Time</p> <p>If Above Conditions have been met, Increment 1st gear fail counter</p> | <p>&gt;= 400 RPM</p> <p>&gt;= Please refer to Shift Table 3 in Time Supporting Documents (Sec)</p> |  |                        | <p>Please See Table Neutral 5 For Timer (Sec)</p> <p>&gt;= 3 1st Gear Fail Count</p> <p>or</p> | One Trip      |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                      | Threshold<br>Value                                 | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required                                    | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|---|---------------|
|                      |               |                                 | and C1234 fail counter                       |  |                          |                      | >= 14 C1234 Clutch Fail Count                       |               |
|                      |               |                                 | <u>Fail Case</u> Case: Steady State 2nd Gear |  |                          |                      |   |               |
|                      |               |                                 | Gear slip                                    | >= 400 RPM   |                          |                      | >= 5 Please See Table 5 For Neutral Timer (Sec) Cal |               |
|                      |               |                                 | Intrusive test: commanded 3rd gear           |  |                          |                      |   |               |
|                      |               |                                 | If attained Gear ≠ 3rd for Time              | >= Please refer to Table 3 in Supporting Documents | Shift Time (Sec)         |                      |   |               |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | If Above Conditions<br>have been met,<br>Increment 2nd gear<br>fail counter<br><br><br>and C1234 fail<br>counter  |                    |                          |                      | >= 3 2nd Gear<br>Fail Count<br><br>or<br><br>>= 14 C1234<br>Clutch<br>Fail Count  |               |
|                      |               |                                 | <u>Fail</u><br><u>Case</u> Case: Steady State<br><u>3</u> 3rd Gear<br><br><br><br><br><br><br><br><br><br>Gear slip<br><br><br><br><br><br><br><br><br><br>Intrusive test:<br>commanded 4th<br>gear | >= 400 RPM         |                          |                      | Please<br>See<br>Table Neutral<br>>= 5 For Timer<br>Neutra (Sec)<br>l Time<br>Cal |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|--|---------------|
|                      |               |                                 | <p>If attained Gear ≠ 4th for time</p> <p>If Above Conditions have been met, Increment 3rd gear fail counter</p> <p>and C1234 fail counter</p> | <p>Please refer to Shift Table 3 in Time Supporting Documents (Sec)</p> <p>&gt;=</p> |                          |                      | <p>&gt;= 3 3rd Gear Fail Count</p> <p>or</p> <p>&gt;= 14 C1234 Clutch Fail Count</p> |               |
|                      |               |                                 | <p><u>Fail Case</u><br/>4 Case: Steady State 4th Gear</p> <p>Gear slip</p>   | <p>&gt;= 400 RPM</p>   |                          |                      | <p>Please See Table 5 For Neutral Timer (Sec) Cal</p>                                |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|---|--|---------------|
|                      |               |                                 | Intrusive test:<br>commanded 5th<br>gear<br><br>If attained Gear =<br>5th For Time<br><br>If Above Conditions<br>have been met,<br>Increment 4th gear<br>fail counter<br><br>and C1234 fail<br>counter | Please<br>refer to Shift<br>Table 3 in Time<br>Supporting (Sec)<br>Documents<br><br>>= |                          | = FALSE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE Boolean | >= 3 4th Gear<br>Fail Count<br><br>or<br><br>>= 14 C1234<br>Clutch<br>Fail Count |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                           | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Hydraulic System<br>Pressurized                    | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Minimum output speed for<br>RVT                    | >= 0 RPM             |                  |               |
|                      |               |                                 |                         |                    | A OR B   |                      |                  |               |
|                      |               |                                 |                         |                    | (A) Output speed enable                            | >= 67 RPM            |                  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal<br>enable                    | >= 0.500488 Pct      |                  |               |
|                      |               |                                 |                         |                    | Common Enable Criteria                             |                      |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo                                | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi                                | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo                                    | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                    | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the<br>allowable limits for | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | Throttle Position Signal<br>valid                  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | HSD Enabled  | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid<br>Temperature                  | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                           | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                          | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not<br>present              | = TRUE               |                  |               |

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description                           | Malfunction<br>Criteria  | Threshold<br>Value                                     | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required | Mil<br>Illum. |
|----------------------------------|---------------|---|--|--|--|---|------------------|---------------|
|                                  |               |   |  |  | <p>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</p> <p>MIL not illuminated for<br/>DTC's:</p> | <p>TCM: P0716, P0717,<br/>P0722, P0723, P182E</p> <p>ECM: P0101, P0102,<br/>P0103, P0106, P0107,<br/>P0108, P0171, P0172,<br/>P0174, P0175, P0201,<br/>P0202, P0203, P0204,<br/>P0205, P0206, P0207,<br/>P0208, P0300, P0301,<br/>P0302, P0303, P0304,<br/>P0305, P0306, P0307,<br/>P0308, P0401, P042E</p> |                  |               |
| Variable Bleed<br>Solenoid (VBS) | P2724         | Pressure Control (PC)<br>Solenoid E Stuck On<br>(Dynamic) | <p>Primary Offgoing<br/>Clutch is<br/>exhausted (See<br/>Table 10 in<br/>Supporting<br/>Documents for<br/>Exhaust Delay<br/>Timers)</p> <p>Primary Oncoming<br/>Clutch Pressure<br/>Command Status</p> | <p>= TRUE Boolean</p> <p>= Maximum<br/>pressurized</p> |  |   |                  | One<br>Trip   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria   | Threshold<br>Value             | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|---|--------------------------------|--------------------------|----------------------|------------------|---------------|
|                      |               |                                 | Primary Offgoing<br>Clutch Pressure<br>Command Status                       | = Clutch<br>exhaust<br>command |                          |                      |                  |               |
|                      |               |                                 | Range Shift Status  | ≠ Initial<br>Clutch<br>Control |                          |                      |                  |               |
|                      |               |                                 | Attained Gear Slip  | <= 40 RPM                      |                          |                      |                  |               |
|                      |               |                                 | If the above conditions are true increment appropriate Fail 1 Timers Below: |                                |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-6 shifting with throttle)                                | >= 0.2998047 sec               |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(2-6 shifting without throttle)                             | >= 0.5 sec                     |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(3-5 shifting with throttle)                                | >= 0.2998047 sec               |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(3-5 shifting without throttle)                             | >= 0.5 sec                     |                          |                      |                  |               |
|                      |               |                                 | fail timer 1<br>(4-5 shifting with throttle)                                | >= 0.2998047 sec               |                          |                      |                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | fail timer 1<br>(4-5 shifting without<br>throttle)                             | >= 0.5 sec         |                          |                      |   |               |
|                      |               |                                 | fail timer 1<br>(4-6 shifting with<br>throttle)                                | >= 0.2998047 sec   |                          |                      |   |               |
|                      |               |                                 | fail timer 1<br>(4-6 shifting without<br>throttle)                             | >= 0.5 sec         |                          |                      |   |               |
|                      |               |                                 | If Attained Gear<br>Slip is Less than<br>Above Cal<br>Increment Fail<br>Timers |                    |                          |                      | Total<br>Fail<br>Time =<br>(Fail 1<br>+ Fail<br>2) See<br>Enable<br>Timers<br>for Fail<br>Timer<br>1, and<br>Refere<br>nce<br>Suppo<br>rting<br>Table<br>15 for<br>Fail<br>Timer<br>2 |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required  | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--------------------------|----------------------|---|---------------|
|                      |               |                                 | <p>If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter</p> <p>2nd gear fail counter</p> <p>3rd gear fail counter</p> <p>4th gear fail counter</p> <p>total fail counter</p> |                    |                          |                      | <p>&gt;= 3 Fail Counter From 2nd Gear</p> <p>&gt;= 3 Fail Counter From 3rd Gear</p> <p>&gt;= 3 Fail Counter From 4th Gear</p> <p>&gt;= 5 Total Fail Counter</p> |               |
|                      |               |                                 |  |                    | TUT Enable temperature   | >= -6.65625 °C       |   |               |
|                      |               |                                 |  |                    | Input Speed Sensor fault | = FALSE Boolean      |   |               |



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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|----------------------------|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Output Speed Sensor fault  | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Command / Attained Gear    | ≠ 1st Boolean        |                  |               |
|                      |               |                                 |                         |                    | High Side Driver ON        | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | output speed limit for TUT | >= 100 RPM           |                  |               |
|                      |               |                                 |                         |                    | input speed limit for TUT  | >= 150 RPM           |                  |               |
|                      |               |                                 |                         |                    | PRNDL state defaulted      | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | IMS Fault Pending          | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Service Fast Learn Mode    | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | HSD Enabled                | = TRUE Boolean       |                  |               |

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description                                | Malfunction<br>Criteria                               | Threshold<br>Value   | Secondary<br>Malfunction          | Enable<br>Conditions   | Time<br>Required | Mil<br>Illum. |
|----------------------------------|---------------|--|---|--|-----------------------------------|--|------------------|---------------|
|                                  |               |  |   | Disa<br>ble<br>Con<br>d<br>i<br>t<br>i<br>o<br>n<br>s:   | MIL not Illuminated for<br>DTC's: | TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |                  |               |
| Variable Bleed<br>Solenoid (VBS) | P2724         | Pressure Control (PC)<br>Solenoid E Stuck On<br>(Steady State) | <u>Fail</u><br><u>Case</u><br>1<br><br>Case: 5th Gear | Table<br>Based<br>value<br>Please rpm/s<br>>=<br>Refer to 3D ec<br>Table 1 in<br>supporting<br>documents |                                   |  |                  | One<br>Trip   |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria                       | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required | Mil<br>Illum.                |
|----------------------|---------------|---------------------------------|---|--|--------------------------|----------------------|------------------|------------------------------|
|                      |               |                                 | Min Delta Output<br>Speed Hysteresis          | <p>Table<br/>Based<br/>value<br/>Please rpm/s<br/>Refer to 3D ec<br/>Table 2 in<br/>supporting<br/>documents</p> |                          |                      |                  |                              |
|                      |               |                                 | If the Above is True<br>for Time              | <p>Table<br/>Based<br/>Time<br/>Please Sec<br/>Refer to<br/>Table 17 in<br/>supporting<br/>documents</p>         |                          |                      |                  |                              |
|                      |               |                                 | Intrusive test:<br>(C35R clutch<br>exhausted) |  |                          |                      |                  |                              |
|                      |               |                                 | Gear Ratio                                    | <= 1.2095947   |                          |                      |                  |                              |
|                      |               |                                 | Gear Ratio                                    | >= 1.0943604   |                          |                      |                  |                              |
|                      |               |                                 | If the above<br>parameters are<br>true        |  |                          |                      | >= 1.1           | Fail Timer<br>(Sec)          |
|                      |               |                                 |   |  |                          |                      | >= 3             | Fail Count<br>in 5th<br>Gear |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions | Time<br>Required                 | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--|--------------------------|----------------------|----------------------------------|---------------|
|                      |               |                                 |  |  |                          |                      | OR<br><br>>= 3 Total Fail Counts |               |
|                      |               |                                 | Fail Case 2<br><br>Case: 6th Gear<br><br>Max Delta Output Speed Hysteresis<br><br>Min Delta Output Speed Hysteresis<br><br>If the Above is True for Time | Table Based value<br>Please Refer to 3D ec Table 1 in supporting documents<br><br>Table Based value<br>Please Refer to 3D ec Table 2 in supporting documents<br><br>Table Based Time<br>Please Refer to Table 17 in supporting documents |                          |                      |                                  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required   | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|--|--------------------|--|---|--|---------------|
|                      |               |                                 | Intrusive test:<br>(CB26 clutch exhausted)<br><br>Gear Ratio <= 1.2095947<br><br>Gear Ratio >= 1.0943604<br><br>If the above parameters are true |                    |  |   | >= 1.1 Fail Timer (Sec)<br><br>>= 3 Fail Count in 6th Gear<br>OR<br>>= 3 Total Fail Counts |               |
|                      |               |                                 |  |                    | PRNDL State defaulted<br><br>inhibit RVT<br><br>IMS fault pending indication<br><br>output speed<br><br>TPS validity flag<br><br>HSD Enabled | = FALSE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>>= 0 RPM<br><br>= TRUE Boolean<br><br>= TRUE Boolean |  |               |

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MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description | Malfunction<br>Criteria | Threshold<br>Value | Secondary<br>Malfunction                         | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|---------------------------------|-------------------------|--------------------|--|----------------------|------------------|---------------|
|                      |               |                                 |                         |                    | Hydraulic_System_Pressurized                     | = TRUE Boolean       |                  |               |
|                      |               |                                 |                         |                    | A OR B   |                      |                  |               |
|                      |               |                                 |                         |                    | (A) Output speed enable                          | >= 67 Nm             |                  |               |
|                      |               |                                 |                         |                    | (B) Accelerator Pedal enable                     | >= 0.500488 Nm       |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Lo                              | >= 8.599609 Volts    |                  |               |
|                      |               |                                 |                         |                    | Ignition Voltage Hi                              | <= 31.99902 Volts    |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Lo                                  | >= 400 RPM           |                  |               |
|                      |               |                                 |                         |                    | Engine Speed Hi                                  | <= 7500 RPM          |                  |               |
|                      |               |                                 |                         |                    | Engine Speed is within the allowable limits for  | >= 5 Sec             |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Accelerator Pedal enable | >= 5.000305 Pct      |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | >= 5 Nm              |                  |               |
|                      |               |                                 |                         |                    | if Attained Gear=1st FW Engine Torque Enable     | <= 8191.875 Nm       |                  |               |
|                      |               |                                 |                         |                    | Transmission Fluid Temperature                   | >= -6.65625 °C       |                  |               |
|                      |               |                                 |                         |                    | Input Speed Sensor fault                         | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Output Speed Sensor fault                        | = FALSE Boolean      |                  |               |
|                      |               |                                 |                         |                    | Default Gear Option is not present               | = TRUE               |                  |               |

| Component/<br>System             | Fault<br>Code | Monitor Strategy<br>Description   | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions  | Time<br>Required  | Mil<br>Illum. |
|----------------------------------|---------------|---|---|--------------------|----------------------------|---|---|---------------|
|                                  |               |   |   |                    | Disable<br>Condition<br>s: | MIL not Illuminated for<br>DTC's:<br><br>TCM: P0716, P0717,<br>P0722, P0723, P182E<br><br>ECM: P0101, P0102,<br>P0103, P0106, P0107,<br>P0108, P0171, P0172,<br>P0174, P0175, P0201,<br>P0202, P0203, P0204,<br>P0205, P0206, P0207,<br>P0208, P0300, P0301,<br>P0302, P0303, P0304,<br>P0305, P0306, P0307,<br>P0308, P0401, P042E |   |               |
| Variable Bleed<br>Solenoid (VBS) | P2729         | Pressure Control (PC)<br>Solenoid E Control<br>Circuit Low<br>(C1234 VBS) | The HWIO reports<br>a low voltage<br>(ground short) error<br>flag | = TRUE Boolean     |                            |   | >= 0.3 Fail Time<br>(Sec)<br><br>out 0.375 Sample<br>of Time<br>(Sec) | One<br>Trip   |
|                                  |               |   |   |                    | P2729 Status is not        | = Test<br>Failed<br>This Key<br>On or<br>Fault<br>Active  |   |               |

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MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                   | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|---|--|--------------------|--|----------------------|--|---------------|
|                               |               |   |  |                    | Ignition Voltage >= 8.599609 Volt<br>Ignition Voltage <= 31.99902 Volt<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br><br>Disable Conditions:<br>MIL not Illuminated for DTC's:<br>TCM: None<br>ECM: None |                      |  |               |
| Variable Bleed Solenoid (VBS) | P2730         | Pressure Control (PC) Solenoid E Control Circuit High (C1234 VBS) | The HWIO reports a high voltage (open or power short) error flag | = TRUE Boolean     |  |                      | >= 0.3 Fail Time (Sec)<br><br>out 0.375 Sample Time (Sec) of | One Trip      |
|                               |               |   |  |                    | P2730 Status is not = Test Failed This Key On or Fault Active<br><br>Ignition Voltage >= 8.599609 Volt<br>Ignition Voltage <= 31.99902 Volt  |                      |  |               |



13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description       | Malfunction<br>Criteria   | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions | Time<br>Required   | Mil<br>Illum. |
|-------------------------------|---------------|---------------------------------------|---|--------------------|---|----------------------|--|---------------|
|                               |               |                                       |   |                    | Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec<br><br><b>Disable Conditions:</b><br>MIL not Illuminated for DTC's:<br>TCM: None<br>ECM: None |                      |  |               |
| Variable Bleed Solenoid (VBS) | P2763         | Torque Converter Clutch Pressure High | The HWIO reports a low pressure/high voltage (open or power short) error flag | = TRUE Boolean     |   |                      | >= 4.4 Fail Time (Sec)<br><br>out of 5 Sample Time (Sec) | Two Trips     |
|                               |               |                                       |   |                    | P2763 Status is not = Test Failed This Key On or Fault Active<br><br>Ignition Voltage >= 8.599609 Volt<br>Ignition Voltage <= 31.99902 Volt<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM            |                      |  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System          | Fault<br>Code | Monitor Strategy<br>Description                                       | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required  | Mil<br>Illum. |
|-------------------------------|---------------|---|--|--------------------|---|--|---|---------------|
|                               |               |   |  |                    | Engine Speed is within the allowable limits for<br><br>High Side Driver Enabled<br><br><b>Disable Condition s:</b><br><b>MIL not Illuminated for DTC's:</b> | >= 5 Sec<br><br>= TRUE Boolean<br><br>TCM: P0658, P0659<br>ECM: None |   |               |
| Variable Bleed Solenoid (VBS) | P2764         | Torque Converter Clutch Pressure Control Solenoid Control Circuit Low | The HWIO reports a high pressure/low voltage (ground short) error flag | = TRUE Boolean     |   |  | >= 4.4 MPH<br><br>out of 5 MPH  | One Trip      |
|                               |               |   |  |                    | P2764 Status is not   | = Test Failed This Key On or Fault Active                            | Ignition Voltage >= 8.599609 Volt<br>Ignition Voltage <= 31.99902 Volt<br>Engine Speed >= 400 RPM<br>Engine Speed <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec |               |

13 OBDG05A Transmission Diagnostics

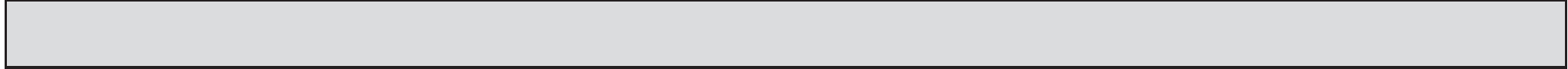
MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description                 | Malfunction<br>Criteria                            | Threshold<br>Value | Secondary<br>Malfunction | Enable<br>Conditions   | Time<br>Required                       | Mil<br>Illum. |
|----------------------|---------------|---|--|--------------------|--------------------------|--|--|---------------|
|                      |               |   |  |                    | High Side Driver Enabled | = TRUE Boolean   |  |               |
|                      |               |   |  |                    | Disable Condition s:     | MIL not Illuminated for DTC's:<br>TCM: P0658, P0659<br>ECM: None |  |               |
| Communication        | U0073         | Controller Area Network Bus Communication Error | CAN Hardware Circuitry Detects a Low Voltage Error | = TRUE Boolean     |                          |  | >= 62 Fail counts (≈ 10 seconds)       | One Trip      |
|                      |               |   | Delay timer  | >= 0.1125 sec      |                          |  | Out of 70 Sample Counts (≈ 11 seconds) |               |
|                      |               |   |  |                    | Stabilization delay      | >= 3 sec   |  |               |
|                      |               |   |  |                    | Ignition Voltage         | >= 8.599609 Volt   |  |               |
|                      |               |   |  |                    | Ignition Voltage         | <= 31.99902 Volt   |  |               |
|                      |               |   |  |                    | Power Mode               | = Run  |  |               |
|                      |               |   |  |                    | Disable Condition s:     | MIL not Illuminated for DTC's:<br>TCM: None<br>ECM: None         |  |               |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description                      | Malfunction<br>Criteria                           | Threshold<br>Value | Secondary<br>Malfunction   | Enable<br>Conditions | Time<br>Required | Mil<br>Illum. |
|----------------------|---------------|--|---|--------------------|--|----------------------|------------------|---------------|
| Communication        | U0100         | Lost Communications with ECM (Engine Control Module) | CAN messages from ECM are not received by the TCM | = TRUE Boolean     |  |                      | >= 12 sec        | One Trip      |
|                      |               |  |   |                    | Stabilization delay >= 3 sec<br>Ignition Voltage >= 8.599609 Volt<br>Ignition Voltage <= 31.99902 Volt<br>Power Mode = Run<br><br>Disable Conditions:<br>MIL not Illuminated for DTC's:<br>TCM: U0073<br>ECM: None |                      |                  |               |



Additional Trans Diagnostics

|             |       |                                    |                            |                |   |  |                        |                |
|-------------|-------|------------------------------------|----------------------------|----------------|---|--|------------------------|----------------|
| Mode Switch | P071A | Transmission Mode Switch A Circuit | Tow Haul Mode Switch state | = TRUE Boolean |   |  | >= 600 Fail Time (Sec) | Special No MIL |
|             |       |                                    |                            |                | Ignition Voltage Lo >= 8.599609 Volts<br>Ignition Voltage Hi <= 31.99023 Volts<br>Engine Speed Lo >= 400 RPM<br>Engine Speed Hi <= 7500 RPM<br>Engine Speed is within the allowable limits for >= 5 Sec |  |                        |                |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                          | Fault<br>Code | Monitor Strategy<br>Description       | Malfunction<br>Criteria       | Threshold<br>Value                                 | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required          | Mil<br>Illum.     |
|---|---------------|---------------------------------------|-------------------------------|--|---|--|---------------------------|-------------------|
|   |               |                                       |                               |  | Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's: | TCM: P1762<br>ECM: None  |                           |                   |
| Mode Switch                                   | P071D         | Transmission Mode<br>Switch B Circuit | Sport Mode Switch<br>state    | = TRUE Boolean                                     |   |  | >= 600 Fail Time<br>(Sec) | Special<br>No MIL |
|   |               |                                       |                               |  |   | Ignition Voltage Lo >= 8.599609 Volts<br>Ignition Voltage Hi <= 31.99902 Volts<br>Engine Speed Lo >= 400 RPM<br>Engine Speed Hi <= 7500 RPM<br>Engine Speed is within the<br>allowable limits for >= 5 Sec<br>Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's:<br>TCM: P1762<br>ECM: None |                           |                   |
| Transmission<br>Output Speed<br>Sensor (TOSS) | P077C         | Output Speed Sensor<br>Circuit Low    | TOSS Analog<br>Signal Voltage | <= 0.25 Volts                                      |   |  | >= 0.05 sec               | One<br>Trip       |
|   |               |                                       | P077C Status is<br>not        | = Test Failed<br>This Key<br>On or Fault<br>Active |   |  |                           |                   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                          | Fault<br>Code | Monitor Strategy<br>Description     | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction | Enable<br>Conditions  | Time<br>Required      | Mil<br>Illum. |
|---|---------------|-------------------------------------|---|--|--------------------------|---|-----------------------|---------------|
|   |               |                                     | <p>If the above conditons have been met, increment the P077C Fail Counter</p> <p>DTC P077C Sets when the Fail Counter</p> | <p>&gt;= 75 Counts</p>   |                          | <p>P077C Enable Calibration = 1 Boolean</p> <p>Ignition Voltage Lo &gt;= 9 Volts</p> <p>Ignition Voltage Hi &lt;= 31.99023 Volts</p> <p><b>Disable Condition s:</b><br/>MIL not Illuminated for DTC's:<br/>TCM: P077D</p> |                       |               |
| Transmission<br>Output Speed<br>Sensor (TOSS) | P077D         | Output Speed Sensor<br>Circuit High | <p>TOSS Analog Signal Voltage</p> <p>P077D Status is not</p>  | <p>&gt;= 4.75 Volts</p> <p>= Test Failed This Key On or Fault Active</p> |                          |   | <p>&gt;= 0.05 sec</p> | One<br>Trip   |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                          | Fault<br>Code | Monitor Strategy<br>Description                 | Malfunction<br>Criteria   | Threshold<br>Value                               | Secondary<br>Malfunction                           | Enable<br>Conditions  | Time<br>Required      | Mil<br>Illum.   |
|---|---------------|---|---|--|--|---|-----------------------|-----------------|
|   |               |   | <p>If the above conditons have been met, increment the P077D Fail Counter</p> |  |  |   |                       |                 |
|   |               |   | <p>DTC P077D Sets when the Fail Counter</p>                                   | <p>&gt;= 75 Counts</p>                           | <p>P077D Enable Calibration</p>                    | <p>= 1 Boolean</p> <p>Ignition Voltage Lo &gt;= 9 Volts</p> <p>Ignition Voltage Hi &lt;= 31.99023 Volts</p> |                       |                 |
|   |               |   |   |  | <p>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</p> | <p>MIL not Illuminated for DTC's:<br/>TCM: P077C</p>  |                       |                 |
| <p>Transmission Input Speed Sensor (TISS)</p> | <p>P07BF</p>  | <p>Input/Turbine Speed Sensor A Circuit Low</p> | <p>TISS Analog Signal Voltage</p>   | <p>&lt;= 0.25 Volts</p>                          |  |   | <p>&gt;= 0.05 sec</p> | <p>One Trip</p> |
|   |               |   | <p>P07BF Status is not</p>  | <p>= Test Failed This Key On or Fault Active</p> |  |   |                       |                 |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System                   | Fault<br>Code | Monitor Strategy<br>Description           | Malfunction<br>Criteria   | Threshold<br>Value   | Secondary<br>Malfunction  | Enable<br>Conditions  | Time<br>Required      | Mil<br>Illum. |
|--|---------------|---|---|--|---|---|-----------------------|---------------|
|  |               |   | <p>If the above conditons have been met, increment the P07BF Fail Counter</p> <p>DTC P07BF Sets when the Fail Counter</p> | <p>&gt;= 75 Counts</p>   | <p>P07BF Enable Calibration</p> <p>Ignition Voltage Lo</p> <p>Ignition Voltage Hi</p> <p><b>Disa<br/>ble<br/>Cond<br/>ition<br/>s:</b></p> <p><b>MIL not Illuminated for DTC's:</b></p> | <p>= 1 Boolean</p> <p>&gt;= 9 Volts</p> <p>&lt;= 31.99023 Volts</p> |                       |               |
| Transmission Input Speed Sensor (TISS) | P07C0         | Input/Turbine Speed Sensor A Circuit High | <p>TISS Analog Signal Voltage</p> <p>P07C0 Status is not</p>  | <p>&gt;= 4.75 Volts</p> <p>= Test Failed This Key On or Fault Active</p> |   |   | <p>&gt;= 0.05 sec</p> | One Trip      |



13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description    | Malfunction<br>Criteria   | Threshold<br>Value     | Secondary<br>Malfunction  | Enable<br>Conditions   | Time<br>Required       | Mil<br>Illum.  |
|----------------------|---------------|------------------------------------|---|------------------------|---|--|------------------------|----------------|
|                      |               |                                    | <p>If the above conditons have been met, increment the P07C0 Fail Counter</p> <p>DTC P07C0 Sets when the Fail Counter</p> | <p>&gt;= 75 Counts</p> |   | <p>P07C0 Enable Calibration = 1 Boolean</p> <p>Ignition Voltage Lo &gt;= 9 Volts</p> <p>Ignition Voltage Hi &lt;= 31.99023 Volts</p> |                        |                |
|                      |               |                                    |   |                        | <p><b>Disa<br/>ble<br/>Con<br/>diti<br/>on<br/>s:</b></p> <p><b>MIL not Illuminated for DTC's:</b></p>  |  |                        |                |
| Mode Switch          | P07D1         | Transmission Mode Switch E Circuit | Comfort Mode Switch state   | = TRUE Boolean         |   |  | >= 600 Fail Time (Sec) | Special No MIL |
|                      |               |                                    |   |                        | <p>Ignition Voltage Lo &gt;= 8.599609 Volts</p> <p>Ignition Voltage Hi &lt;= 31.99023 Volts</p> <p>Engine Speed Lo &gt;= 400 RPM</p> <p>Engine Speed Hi &lt;= 7500 RPM</p> <p>Engine Speed is within the allowable limits for &gt;= 5 Sec</p> |  |                        |                |

13 OBDG05A Transmission Diagnostics

MAIN SECTION

| Component/<br>System | Fault<br>Code | Monitor Strategy<br>Description                               | Malfunction<br>Criteria  | Threshold<br>Value | Secondary<br>Malfunction  | Enable<br>Conditions    | Time<br>Required                                       | Mil<br>Illum.     |
|----------------------|---------------|---|--|--------------------|---|-------------------------|--|-------------------|
|                      |               |   |  |                    | Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's: | TCM: P1762<br>ECM: None |  |                   |
| Mode Switch          | P1762         | Transmission Mode<br>Switch Signal Circuit<br>(rolling count) | Rolling count value<br>received from BCM<br>does not match<br>expected value | = TRUE Boolean     |   |                         | >= 3 Fail Counter<br><br>> 10 Sample<br>Timer<br>(Sec) | Special<br>No MIL |
|                      |               |   |  |                    | Pattern Switch Message<br>Health                                | = TRUE Boolean          |  |                   |
|                      |               |   |  |                    | Disable<br>Condition<br>s:<br>MIL not Illuminated for<br>DTC's: | TCM: None<br>ECM: None  |  |                   |

## Supporting Documents

**Table 1**

|       |       |       |        |        |        |        |        |        |        |     |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-----|
| Axis  | 0.00  | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 | N*m |
| Curve | 50.00 | 50.00 | 50.00  | 50.00  | 50.00  | 50.00  | 50.00  | 50.00  | 50.00  | RPM |

**Table 2**

|       |        |       |       |     |
|-------|--------|-------|-------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | °C  |
| Curve | 409.59 | 2.00  | 2.00  | Sec |

**Table 3**

|       |        |       |       |     |
|-------|--------|-------|-------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | °C  |
| Curve | 409.59 | 4.00  | 4.00  | Sec |

**Table 4**

|       |        |       |       |     |
|-------|--------|-------|-------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | °C  |
| Curve | 409.59 | 2.00  | 2.00  | Sec |

**Table 5**

|       |        |       |       |     |
|-------|--------|-------|-------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | °C  |
| Curve | 409.59 | 3.00  | 3.00  | Sec |

**Table 6**

|       |        |       |       |       |        |     |
|-------|--------|-------|-------|-------|--------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | 80.00 | 120.00 | °C  |
| Curve | 409.00 | 3.60  | 1.60  | 1.40  | 1.40   | Sec |

**Table 7**

|       |        |       |       |       |        |     |
|-------|--------|-------|-------|-------|--------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | 80.00 | 120.00 | °C  |
| Curve | 409.00 | 3.40  | 1.40  | 1.30  | 1.20   | Sec |

**Table 8**

|       |        |       |       |       |        |     |
|-------|--------|-------|-------|-------|--------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | 80.00 | 120.00 | °C  |
| Curve | 409.00 | 3.60  | 1.60  | 1.50  | 1.40   | Sec |

**Table 9**

|       |        |       |       |       |        |     |
|-------|--------|-------|-------|-------|--------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | 80.00 | 120.00 | °C  |
| Curve | 409.00 | 3.30  | 1.30  | 1.20  | 1.10   | Sec |

**Table 10**

|       |        |        |      |       |        |     |
|-------|--------|--------|------|-------|--------|-----|
| Axis  | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 | °C  |
| Curve | 3.03   | 1.86   | 1.00 | 0.75  | 0.58   | Sec |

**Table 11**

|       |        |        |      |       |        |     |
|-------|--------|--------|------|-------|--------|-----|
| Axis  | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 | °C  |
| Curve | 1.72   | 1.11   | 0.60 | 0.36  | 0.22   | Sec |

**Table 12**

|       |        |        |      |       |        |     |
|-------|--------|--------|------|-------|--------|-----|
| Axis  | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 | °C  |
| Curve | 2.12   | 1.39   | 0.84 | 0.64  | 0.33   | Sec |

**Table 13**

|       |        |        |      |       |        |     |
|-------|--------|--------|------|-------|--------|-----|
| Axis  | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 | °C  |
| Curve | 2.51   | 0.95   | 0.50 | 0.29  | 0.13   | Sec |

**Table 14**

|       |        |        |      |       |        |     |
|-------|--------|--------|------|-------|--------|-----|
| Axis  | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 | °C  |
| Curve | 2.97   | 0.82   | 0.47 | 0.20  | 0.13   | Sec |

**Table 15**

|       |        |        |        |        |      |       |       |       |       |     |
|-------|--------|--------|--------|--------|------|-------|-------|-------|-------|-----|
| Axis  | -40.00 | -30.00 | -20.00 | -10.00 | 0.00 | 10.00 | 20.00 | 30.00 | 40.00 | °C  |
| Curve | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00  | 0.00  | 0.00  | 0.00  | Sec |

**Table 16**

|       |        |       |       |     |
|-------|--------|-------|-------|-----|
| Axis  | -6.67  | -6.66 | 40.00 | °C  |
| Curve | 409.59 | 2.50  | 2.50  | Sec |

**Table 17**

|       |       |       |       |     |
|-------|-------|-------|-------|-----|
| Axis  | -6.67 | -6.66 | 40.00 | °C  |
| Curve | 0.40  | 0.35  | 0.30  | Sec |

**Table 18**

|       |        |        |        |       |       |       |        |        |        |    |
|-------|--------|--------|--------|-------|-------|-------|--------|--------|--------|----|
| Axis  | -40.10 | -40.00 | -20.00 | 0.00  | 30.00 | 60.00 | 100.00 | 149.00 | 149.10 | °C |
| Curve | 256.00 | 50.00  | 45.00  | 40.00 | 34.00 | 25.00 | 20.00  | 20.00  | 256.00 | °C |

**Table 19**

|       |        |        |        |       |       |       |        |        |        |    |
|-------|--------|--------|--------|-------|-------|-------|--------|--------|--------|----|
| Axis  | -40.10 | -40.00 | -20.00 | 0.00  | 30.00 | 60.00 | 100.00 | 149.00 | 149.10 | °C |
| Curve | 256.00 | 50.00  | 45.00  | 40.00 | 34.00 | 25.00 | 20.00  | 20.00  | 256.00 | °C |

**Table 20**

|       |        |        |        |      |       |       |        |        |        |    |
|-------|--------|--------|--------|------|-------|-------|--------|--------|--------|----|
| Axis  | -40.10 | -40.00 | -20.00 | 0.00 | 30.00 | 60.00 | 100.00 | 149.00 | 149.10 | °C |
| Curve | 256.00 | 10.00  | 8.00   | 8.00 | 8.00  | 8.00  | 8.00   | 8.00   | 256.00 | °C |

**Table 21**

|       |        |        |       |     |
|-------|--------|--------|-------|-----|
| Axis  | -40.00 | -20.00 | 40.00 | °C  |
| Curve | 5.00   | 3.00   | 1.00  | Sec |

**Supporting Documents - 3D Tables**

3D\_Table 1

|                    |         |
|--------------------|---------|
| X-Axis Calibration | %       |
| Y-Axis Calibration | °C      |
| Table Calibration  | RPM/Sec |

|       |         |         |         |         |         |
|-------|---------|---------|---------|---------|---------|
|       | 0.00    | 2.00    | 5.00    | 25.00   | 100.00  |
| -6.67 | 8191.75 | 8191.75 | 8191.75 | 8191.75 | 8191.75 |
| -6.66 | 8191.75 | 8191.75 | 8191.75 | 8191.75 | 8191.75 |
| 40.00 | 8191.75 | 8191.75 | 8191.75 | 8191.75 | 8191.75 |

3D\_Table 2

|                    |         |
|--------------------|---------|
| X-Axis Calibration | %       |
| Y-Axis Calibration | °C      |
| Table Calibration  | RPM/Sec |

|       |         |         |         |         |         |
|-------|---------|---------|---------|---------|---------|
|       | 0.00    | 2.00    | 5.00    | 25.00   | 100.00  |
| -6.67 | 8191.75 | 8191.75 | 8191.75 | 8191.75 | 8191.75 |
| -6.66 | 500.00  | 500.00  | 300.00  | 300.00  | 300.00  |
| 40.00 | 500.00  | 500.00  | 300.00  | 300.00  | 300.00  |