| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Park Switch Stuck Closed | B2BA2 | Controller specific software that diagnoses the Shifter Park Switch Stuck Closed (in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal fromTCM. If Transmission Shift Lever Position signal is not in Park but Shifter Park Switch is in closed state for X out of Y counts then this DTC gets set. | Shifter Park Switch is | = PARK | All of the following conditions are met:<br>Park Switch Closed Diagnostic Enable is **CbTRUE**<br><br>No Active Lost Communication with Transmission Control Module DTC<br><br>System 12V Battery Voltage is above threshold<br><br>System 12V Battery Voltage Out of Range Delay has Elapsed<br><br>Transmission Shift Lever Position is NOT equal to Park | = TRUE<br><br>U0101<br><br>> 11.00 volts (with hysteresis disable < 10.00 volts)<br><br>> 0.00 milliseconds<br><br>NOT equal to PARK | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Park Switch Stuck Open | B2BA3 | Controller specific software that diagnoses the Shifter Park Switch Stuck Open (not in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal from TOM. If Transmission Shift Lever Position signal is in Park but Shifter Park Switch is in open state for calibratable fail threshold count, then this DTC gets set. And, if Transmission Shift Lever Position signal is in Park and Shifter Park Switch is in closed state for consecutively calibratable pass threshold counts then this diagnostic is passed. | Shifter Park Switch is | NOT equal to PARK | All of the following conditions are met:<br>Park Switch Closed Diagnostic Enable is **CbTRUE**<br><br>No Active Lost Communication with Transmission Control Module DTC<br><br>System 12V Battery Voltage is above threshold<br><br>System 12V Battery Voltage Out of Range Delay has Elapsed<br><br>Transmission Shift Lever Position is equal to PARK | = TRUE<br><br>U0101<br><br>> 11.00 volts (with hysteresis disable < 10.00 volts)<br><br>> 0.00 milliseconds<br><br>= PARK | Diagnostic will fail with 120.00 seconds of continuous fail counts<br><br>Diagnostic will pass with 0.03 seconds of continuous pass counts | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Performance | P058A | The battery monitor module performance diagnostic is required to diagnose if the IBS sensor has any internal faults. The IBS checks a list of performance parameters as part of this diagnostic: reference voltage, voltage calibration check, current claibration check, NVM static data checksum, NVM dynamic data checksum, page 0 checksum, and wakeup timer check. Once all checks are completed in IBS the result is transmitted to BCM where appropriate DTC will be reported to DFIR. This diagnostic occurs once upon LIN wakeup, and the result is transmitted to BCM within 6 seconds. | IBS Sensor Internal Fault is TRUE (Internal IBS diagnostic) | = CeEM_e_IBS_DiagFailed | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Battery Monitor Module Performance Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>U01B000<br><br>P15FF00 | 6 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Current Monitoring Performance | P058B | The Battery Monitor Module Current Performance diagnostic is required to ensure there is not an open circuit fault at the shunt resistor. This diagnostic is performed within IBS and status is communicated to BCM where results are reported to DFIR. . IBS monitors the shunt resistor for open circuit while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 4 fails out of 5 samples at a rate of 16 second per sample. | IBS has open shunt condition, Battery Current Rationality Diagnostic Determination equals Diagnostic Failed (Internal IBS diagnostic) | = CeEM_e_IBS_DiagFailed | All of the following conditoins are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>IBS Current Performance Diagnostic Enable is **TRUE**<br><br>IBS Current Performance Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>Battery Current Rationality Historical Diagnostic Enable is **FALSE** | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= U01B00<br><br>= P15FF00<br><br>= FALSE | 80 seconds (4 fails out of 5 samples at 16 seconds per sample) | Type B, 2 Trips |
| | | | IBS has open shunt condition: Battery Current Rationality Diagnostic Determination equals Diagnostic Failed | = CeEM_e_IBS_DiagFail | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | >11.00 volts (with | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | (Internal IBS diagnostic) | ed | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Performance Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Performance Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Temperature Monitoring Performance | P058C | The battery monitor module temperature monitoring performance is required to diagnose if the difference between IBS NTC raw temperature and IBS ASIC raw temperature is within a rational threshold. This diagnostic is performed in BCM by comparing the difference between NTC and ASIC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 set of sample per 30min while LIN is off. These 24 sets of samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics. | Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold | >10.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Outside Air Temperature is within range<br><br>IBS Temperature Performance Diagnostic Enable is **TRUE**<br><br>IBS Temperature Performance Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>No Active IBS Temperature Out of Range DTCs | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= P058E00, P058F00, P16DE00, P16DF00 | 8 seconds out of a 10 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold | >10.00 degrees Celsius | All of the following conditions are met: | | 8 seconds out of a 10 seconds window | |
| | | | | | System 12V Battery Voltage is above threshold | > 11.00 volts (with hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Outside Air Temperature is within range | > -30.00 degrees Celsius AND <50.00 degrees Celsius | | |
| | | | | | IBS Temperature Performance Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Temperature Performance Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | Historical Temperature Data Down Count is in range | > 0 AMn | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | No Active IBS Temperature Out of Range DTCs | <= 24<br>= P058E00, P058F00, P16DE00, P16DF00 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Voltage Monitoring Performance | P058D | The Battery Monitor Module Voltage Performance diagnostic is required to diagnose if the IBS Battery Voltage Sensor is accurately sensing the 12V Battery Voltage. The IBS battery voltage high resolution will be transmitted via LIN message from the sensor indicating what its internal sensor is reading for voltage. This voltage is compared with BCM's internal voltage reading (12V System Voltage). If the difference between the two voltages is greater than a calibratable threshold, then the fail counter will increment. Due to the high fluctuation of voltage during cranking event, this diagnostic is disabled from beginning of crank to a calibratable time delay after the end of crank. This diagnostic uses an X of Y strategy. | Absolute difference between Battery Monitor Module Voltage and BCM System Voltage is above threshold | >5.00 Volts | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Battery Monitor Module Voltage Performance Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>No Active Battery Voltage Out of Range DTCs<br><br>Powertrain Crank Active is **FALSE**<br><br>Post-Crank Time Delay has elapsed | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= P16D400, P16D500<br><br>= FALSE<br><br>>5,000.00 seconds | 8 seconds out of a 10 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Temperature High | P058E | The Battery Monitor Module Temperature Out of Range High diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics. | Battery Monitor Module ASIC Temperature above threshold | >120.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br>IBS NormalCommEnable is **TRUE**<br>Outside Air Temperature is within range<br>IBS Temperature High Diagnostic Enable is **TRUE**<br>IBS Temperature High Continuous Diagnostic Enable is **TRUE**<br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br>= TRUE<br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br>= TRUE<br>= TRUE<br>= U01B000<br>= P15FF00 | 4 seconds out of a 5 seconds window | Type B, 2 Trips |
| | | | Battery Monitor Module ASIC Temperature above threshold | >120.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | > 11.00 volts (with hysteresis disable < | 4 seconds out of a 5 seconds window | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Outside Air Temperature is in range | > -30.00 degrees Celsius<br>AND<br><50.00 degrees Celsius | | |
| | | | | | IBS Temperature High Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Temperature High Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | Historical Temperature Data Down Count is in range | > 0<br>AND<br><= 24 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Temperature Low | P058F | The Battery Monitor Module Temperature Out of Range Low diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics. | Battery Monitor Module ASIC Temperature below threshold | <-43.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br>IBS NormalCommEnable is **TRUE**<br>Outside Air Temperature is within range<br>IBS Temperature Low Diagnostic Enable is **TRUE**<br>IBS Temperature Low Continuous Diagnostic Enable is **TRUE**<br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br>= TRUE<br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br>= TRUE<br>= TRUE<br>= U01B000<br>= P15FF00 | 4 seconds out of a 5 seconds window | Type B, 2 Trips |
| | | | Battery Monitor Module ASIC Temperature below threshold | <-43.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | > 11.00 volts (with hysteresis disable < | 4 seconds out of a 5 seconds window | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Outside Air Temperature is in range | > -30.00 degrees Celsius<br>AND<br><50.00 degrees Celsius | | |
| | | | | | IBS Temperature Low Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Temperature Low Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | Historical Temperature Data Down Count is in range | > 0<br>AND<br><= 24 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Driver Mode Select Switch A Circuit Low | P05D1 | This DTC will detect an OBD-compliant analog switch bank 1 input that is too low (out-of-range low). | Analog Mode Switch low voltage threshold | < 0.5280 V | VehicleSwitchBankl Diagnostic Enable calibration is **TRUE**<br><br>VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE**<br><br>VehicleSwitchBankl Circuit Out-Of-Range Low Diagnostic Enable calibration is **TRUE** | = TRUE<br><br>= TRUE<br><br>= TRUE | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Driver Mode Select Switch A Circuit High | P05D2 | This DTC will detect an OBD-compliant analog switch bank 1 input that is too high (out-of-range high). | Analog Mode Switch high voltage threshold | > 4.7170 V | VehicleSwitchBankl Diagnostic Enable calibration is **TRUE**<br><br>VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE**<br><br>VehicleSwitchBankl Circuit Out-Of-Range High Diagnostic Enable calibration is **TRUE** | = TRUE<br><br>= TRUE<br><br>= TRUE | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Driver Mode Select Switch A Range/ Performance | P05D3 | This DTC will detect an OBD-compliant analog switch bank 1 input that is invalid within its performance range (in-range deadband). | Analog Mode Switch indeterminate (deadband) regions for 8-state analog resistor ladder | 0.5280 < sensed voltage < 0.6280<br><br>1.0250 < sensed voltage < 1.1025<br><br>1.5220 < sensed voltage < 1.5976<br><br>2.0350 < sensed voltage <2.11<br><br>2.57 < sensed voltage < 2.64<br><br>3.10 < sensed voltage <3.18<br><br>3.61 < sensed voltage < 3.69<br><br>4.13 < sensed voltage < 4.20<br><br>4.62 < sensed voltage < 4.72 | VehicleSwitchBankl Diagnostic Enable calibration is TRUE<br><br>VehicleSwitchBankl Circuit Diagnostic Enable calibration is TRUE<br><br>VehicleSwitchBankl Circuit Performance Diagnostic Enable calibration is TRUE | = TRUE<br><br>= TRUE<br><br>= TRUE | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Read Only Memory (ROM) | P0601 | This DTC will be stored if the calibration/ software checksum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code. | The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations. | 1 failure if the fault is detected during the first pass.<br>5 failures if the fault occurs after the first pass is complete. | | | Diagnostic runs continuously in the background. | Type B, 2 Trips |
| | | | The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations. | 254 failures detected via Error Correcting Code | ROM ECC diagnostic enable is **CbTRUE** | = CbTRUE | Diagnostic runs continuously via the flash hardware. | |
| | | | | In all cases, the failure count is cleared when controller shuts down | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Long Term Memory Reset | P0603 | This DTC detects an invalid NVM which includes Static NVM, Cumuliteve NVM, and SSAR NVM invalidities at start up. | Static NVM region error detected during initialization | | Static NVM fault on default diagnostic enable is **CbTRUE**<br><br>Allow blank BINVDN must be **CbFALSE** | = CbTRUE<br><br>= CbFALSE | Diagnostic runs at controller power up. | Type B, 2 Trips |
| | | | Cumulative NVM region error detected during initialization | | Cumulative NVM fault on default diagnostic enable is **CbTRUE**<br><br>Allow blank BINVDN must be **CbFALSE** | = CbTRUE<br><br>= CbFALSE | Diagnostic runs at controller power up. | |
| | | | SSAR NVM region error detected during initialization. | | SSAR NVM fault on default diagnostic enable is **CbTRUE**<br><br>Allow blank BINVDN must be **CbFALSE** | = CbTRUE<br><br>= CbFALSE | Diagnostic runs at controller power up. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module RAM Failure | P0604 | Indicates that the control module has detected a RAM fault. This includes read/ write failures such as a Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, and Primary Processor eTPU RAM Fault. This diagnostic runs continuously. | Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written | >= 254 counts | | | Fault indication fed from HWIO- diagnostic runs continuously (background loop) | Type B, 2 Trips |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written | >= 254 counts | | | Fault indication fed from HWIO- diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written | >= 3 counts | | | Fault indication fed from HWIO - diagnostic runs continuously (background loop) | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Processor Integrity Fault | P0606 | Indicates that the control module has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for the primary processor. | 2 fails in a row in the MAIN processor's ALU check | | ALU diagnostic enable per CPU is **CbTRUE** | = CbTRUE | Run periodically at 25 ms loop rate | Type B, 2 Trips |
| | | | Checks number of stack over/under flow since last powerup reset | >=5 | Stack Llimit Test diagnostic enable is **CbTRUE** | = CbTRUE | Run periodically at 100ms loop rate | |
| | | | Voltage deviation | > 0.4500 V | ADC Test diagnostic enable is **CbTRUE**<br><br>A2D Test voltages used in diagnosis:<br><br>**Test Voltage 1**<br>**Test Voltage 2**<br>**Test Voltage 3**<br>**Test Voltage 4**<br><br>Arbitrated Battery Voltage | = CbTRUE<br><br>= 0<br>= 0<br>= 1<br>= 1<br>(1 means enabled, 0 means disabled)<br><br>> 7.00 V | 16 / 20 counts or 0.819 seconds continuous - Note: 50 ms/ count | |
| | | | MAIN processor DMA transfer test failures: | 16/20 counts | DMA Transfer Test diagnostic enable is **CbTRUE** | = CbFALSE | Run periodically at 50ms loop rate | |
| | | | Safety critical software is not executed in proper order. End task calculation does not match expected value for failures | >= 1 incorrect sequence | Program Sequence Watch diagnostic enable calibration per task rate is **CbTRUE**<br><br>**5ms**<br>**10ms**<br>**25ms**<br>**50ms**<br>**100ms** | = CbTRUE<br>= CbTRUE<br>= CbTRUE<br>= CbTRUE<br>= CbTRUE | Fail time interval determined per task rate:<br><br>5ms: 12/16 counts<br><br>10ms: 12/16 counts<br><br>25ms: 12/16 counts<br><br>50ms: 6/8 counts | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 100ms: 3/4 counts<br><br>Note: 50 ms/ count | |
| | | | MAIN processor determines a Program Sequence Watch seed has not changed within a specified time period. | Current seed value equals previous seed value. | Last Seed Timeout diagnostic enable is **CbTRUE** | = CbTRUE | Fail tolerant time set per task rate enabled through the Program Sequence Watch function:<br><br>5ms: 822 ms<br>10ms: 822 ms<br>25ms: 822 ms<br>50ms: 822 ms<br>100ms: 1,000 ms<br><br>Note: 50 ms monitoring task rate | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Processor Integrity Performance | P0607 | Indicates that the ECM has detected an internal processor integrity performance. | Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter | >= 3/10 (results in MIL)<br><br>or<br><br>>=5/10 (results in MIL and remedial action) | Flash ECC diagnostic enable is **CbTRUE** | = CbTRUE | Fail indication from HWIO, variable failure dependent on time to access corrupt flash memory | Type B, 2 Trips |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter | >= 3 (results in MIL) / 10<br>5 (results in MIL and remedial action) / 10 | RAM ECC diagnostic enable is **CbTRUE** | = CbTRUE | Fail indication from HWIO, variable failure dependent on time to access corrupt RAM variables | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Powertrain Internal Control Module EEPROM Error | P062F | This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed. | HWIO reports that writing to NVM (at shutdown) will not succeed | | | | Diagnostic runs at controller power up, evaluation of NVM write at shutdown. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 5 Volt Reference #3 Circuit | P0697 | Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough. | BCM percent Vref3 <<br>or<br>BCM percent Vref3 ><br>or<br>the difference between BCM filtered percent Vref3 and percent Vref3 > | 78.13% Vref3<br><br>89.96 % Vref3<br><br>7.0000 % Vref3 | Diagnostic enabled | = CbTRUE | 0.8 seconds out of a 1 seconds window<br><br>or<br><br>200.00 sec continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Temperature Erratic | P100C | The Battery Monitor Module Temperature Erratic diagnostic is required to diagnose if the IBS ASIC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw ASIC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy. | Sum of the absolute difference between 10.00 ASIC Raw Temperature samples is above threshold | >70.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Outside Air Temperature is within range<br><br>Temperature Erratic Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00 | 40 seconds out of a 50 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Internal Temperature Erratic | P100D | The Battery Monitor Module Internal Temperature Erratic diagnostic is required to diagnose if the IBS NTC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw NTC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy. | Sum of the absolute difference between 10.00 NTC Raw Temperature samples is above threshold | >70.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Outside Air Temperature is within range<br><br>Temperature Circuit Erratic Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00 | 40 seconds out of a 50 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Sensor Signal Message Counter Incorrect | P15FF | This DTC monitors for an internal error or error in communication with the Battery Monitor Signal | Any of the Alive Rolling Counts signal values listed below are incorrect for:<br><br>AmpHrsChrgdARC:<br><br>AmpHrsDischrgdARC:<br><br>BatCrnkDatARC:<br><br>BatLINOffDatARC:<br><br>BatStsDatARC:<br><br>CfgWkupDatARC:<br><br>IBSCurrOORAndRatIFOMARC:<br><br>IBSDiagDetARC:<br><br>MsrdTempARC:<br><br>MinCrnkgDatARC:<br><br>MVIAndSOFDatARC:<br><br>BatSOCDatARC: | 8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>8 fail counts out of 10 sample counts | Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All the following conditions are met for<br><br>Partial Network is active<br><br>Power Mode<br><br>Battery Voltage | >= 5,000 milliseconds<br><br>>= 3,000 milliseconds<br><br>= Run<br><br>>11.00 Volts | Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | IBSVItgFOMARC: | 8 fail counts out of 10 sample counts | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Circuit Voltage Low | P16D4 | The Battery Monitor Module Circuit Low Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds. | Battery Monitor Module Circuit Voltage below threshold<br>(Internal IBS Diagnostic) | < 3 Volts | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Battery Voltage Out of Range Low Diagnostic Enable is **TRUE**<br><br>Battery Voltage Out of Range Low Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>Battery Voltage Out of Range Low Historical Diagnostic Enable is **FALSE** | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= FALSE | 0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate) | Type B, 2 Trips |
| | | | Battery Monitor Module Circuit Voltage below threshold<br>(Internal IBS Diagnostic) | < 3 Volts | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | >11.00 volts (with | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Battery Voltage Out of Range Low Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | Battery Voltage Out of Range Low Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Circuit Voltage High | P16D5 | The Battery Monitor Module Circuit High Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range high. Once diagnostics determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds. | Battery Monitor Module Circuit Voltage above threshold<br>(Internal IBS Diagnostic) | > 26 Volts | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Battery Voltage Out of Range High Diagnostic Enable is **TRUE**<br><br>Battery Voltage Out of Range High Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>Battery Voltage Out of Range High Historical Diagnostic Enable is **FALSE** | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= FALSE | 0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate) | Type B, 2 Trips |
| | | | Battery Monitor Module Circuit Voltage above threshold<br>(Internal IBS Diagnostic) | > 26 Volts | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | > 11.00 volts (with | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Battery Voltage Out of Range High Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | Battery Voltage Out of Range High Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Current Low | P16D6 | The Battery Monitor Module Current Out of Range Low diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds. | Battery Monitor Module Current below threshold (Internal IBS diagnostic) | < -1400 Amps | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>IBS Current Out of Range Low Diagnostic Enable is **TRUE**<br><br>IBS Current Out of Range Low Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>Shunt Voltage Out of Range Low Historical Diagnostic Enable is **FALSE** | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= FALSE | 0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate) | Type B, 2 Trips |
| | | | Battery Monitor Module Current below threshold (Internal IBS diagnostic) | < -1400 Amps | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | >11.00 volts (with | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Out of Range Low Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Out of Range Low Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Current High | P16DD | The Battery Monitor Module Current Out of Range High diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range high. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds. | Battery Monitor Module Current above threshold (Internal IBS diagnostic) | > 1400 Amps | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>IBS Current Out of Range High Diagnostic Enable is **TRUE**<br><br>IBS Current Out of Range High Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC<br><br>Shunt Voltage Out of Range High Historical Diagnostic Enable is **FALSE** | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00<br><br>= FALSE | 0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate) | Type B, 2 Trips |
| | | | Battery Monitor Module Current above threshold (Internal IBS diagnostic) | > 1400 Amps | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | > 11.00 volts (with | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Out of Range High Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | IBS Current Out of Range High Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Internal Temperature Circuit Low | P16DE | The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics. | Battery Monitor Module NTC Temperature above threshold | >120.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br>IBS NormalCommEnable is **TRUE**<br>Outside Air Temperature is within range<br>Temperature Circuit Low Diagnostic Enable is **TRUE**<br>Temperature Circuit Low Continuous Diagnostic Enable is **TRUE**<br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br>= TRUE<br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br>= TRUE<br>= TRUE<br>= U01B000<br>= P15FF00 | 4 seconds out of a 5 seconds window | Type B, 2 Trips |
| | | | Battery Monitor Module NTC Temperature above threshold | >120.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold | >11.00 volts (with | 4 seconds out of a 5 seconds window | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is **TRUE** | = TRUE | | |
| | | | | | Outside Air Temperature is in range | > -30.00 degrees Celsius AND <50.00 degrees Celsius | | |
| | | | | | Temperature Circuit Low Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | Temperature Circuit Low Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | Historical Temperature Data Down Count is in range | > 0 AND <= 24 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Internal Temperature Circuit High | P16DF | The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics. | Battery Monitor Module NTC Temperature below threshold | <-43.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Outside Air Temperature is within range<br><br>Temperature Circuit High Diagnostic Enable is **TRUE**<br><br>Temperature Circuit High Continuous Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>> -30.00 degrees Celsius AND <50.00 degrees Celsius<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00 | 4 seconds out of a 5 seconds window | Type B, 2 Trips |
| | | | Battery Monitor Module NTC Temperature below threshold | <-43.00 degrees Celsius | All of the following conditions are met:<br>System 12V Battery Voltage is above | | 4 seconds out of a 5 seconds window | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | threshold | > 11.00 volts (with hysteresis disable < 10.00) | | |
| | | | | | IBS NormalCommEnable is TRUE | = TRUE | | |
| | | | | | Outside Air Temperature is within range | > -30.00 degrees Celsius AND <50.00 degrees Celsius | | |
| | | | | | Temperature Circuit High Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | Temperature Circuit High Historical Diagnostic Enable is **TRUE** | = TRUE | | |
| | | | | | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | | | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | | | Historical Temperature Data Down Count is in range | > 0 AND <= 24 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Random Access Memory (RAM) Error | P16E1 | The battery Monitor Module performance (RAM) error diagnostic is required to diagnose if the IBS sensor has any internal RAM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR. This diagnostic takes approximately 10 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after. | IBS Sensor Internal RAM Fault detected:<br><br>IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic) | = CeEM_e_IBS_DiagFailed | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS LIN Normal Communication Enable is **TRUE**<br><br>Battery Monitor Module RAM Error Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00 | 10 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Random Access Memory (ROM) Error | P16E2 | The battery Monitor Module performance (ROM) error diagnostic is required to diagnose if the IBS sensor has any internal ROM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR.This diagnostic takes approximately 60 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after. | IBS Sensor Internal ROM Fault detected:<br><br>IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic) | = CeEM_e_IBS_DiagFailed | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>Battery Monitor Module ROM Error Diagnostic Enable is **TRUE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= U01B000<br><br>= P15FF00 | 60 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Battery Monitor Module Data Incompatible Diagnostic | P16E3 | The Battery Monitor Module Data Incompatible diagnostic is required to diagnose if the IBS is using the correct configuration information being transmitted by the Host controller to it. The IBS reads and transmits the configuration values it has loaded internally back to the host controller for verification. The historical test evaluates the IBS configuration return values to check if they are equal to the host controller's values. The diagnostic is executed once per host controller wakeup and checks only the first transmitted LIN message containing the IBS return configuration message. The continuous test compares the IBS configuration return values to those sent by BCM and uses X of Y maturation strategy to determine diagnostic state. | Any of the following criteria are met:<br><br>IBS Config Return Battery Type is NOT equal to Vehicle Battery Type Configuration<br><br>Battery Nominal Return C20 is above threshold<br><br>IBS Config Return Battery Cal #1 U40% is above threshold<br><br>IBS Config Return Battery Cal #2 U80% is above threshold<br><br>IfSOC Bounding Limit Configuration check is **TRUE** then following conditions are included<br><br>SOC Bounding Limit Hr3 Difference is above the threshold<br><br>SOC Bounding Limit Hr8 Difference is above the threshold<br><br>SOC Bounding Limit Hr24 Difference is above threshold | NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_TECH-AGM<br><br>>5.00<br><br>>0.50<br><br>>0.50<br><br>= TRUE<br><br>>0.01<br><br>>0.01<br><br>>0.01 | All of the following conditions are met:<br>System 12V Battery Voltage is above threshold<br><br>IBS NormalCommEnable is **TRUE**<br><br>IBS Configuration Diagnostic Continuous Enable is **TRUE**<br><br>Battery Monitor Module Data Incompatible Determination Historical Diagnostic Enable is **FALSE**<br><br>No Active Lost Communication with Intelligent Battery Sensor Module DTC<br><br>No Active Battery Sensor Signal Message Counter Incorrect DTC | > 11.00 volts (with hysteresis disable < 10.00)<br><br>= TRUE<br><br>= TRUE<br><br>= FALSE<br><br>= U01B000<br><br>= P15FF00 | 5 seconds out of a 6 seconds window | Type B, 2 Trips |
| | | | Any of the following criteria are met<br><br>IBS Config Return | | All of the following conditions are met:<br>System 12V Battery Voltage is above | | 1 second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Battery Type is NOT equal to Vehicle Battery Type Configuration | NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_AGM | threshold | > 11.00 volts (with hysteresis disable < 10.00) | | |
| | | | Battery Nominal Return C20 is above threshold | >5.00 | IBS NormalCommEnable is TRUE | = TRUE | | |
| | | | IBS Config Return Battery Cal #1 U40% is above threshold | >0.50 | IBS Configuration Diagnostic Historical Enable is TRUE | = TRUE | | |
| | | | IBS Config Return Battery Cal #2 U80% is above threshold | >0.50 | No Active Lost Communication with Intelligent Battery Sensor Module DTC | = U01B000 | | |
| | | | IfSOC Bounding Limit Configuration check is TRUE then following conditions are included | = TRUE | No Active Battery Sensor Signal Message Counter Incorrect DTC | = P15FF00 | | |
| | | | SOC Bounding Limit Hr8 Difference is above the threshold | >0.01 | | | | |
| | | | SOC Bounding Limit Hr8 Difference is above the threshold | >0.01 | | | | |
| | | | SOC Bounding Limit Hr24 Difference is above threshold | >0.01 | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Wake-Up Not Detected | P16FD | Detects when a control module did not wake-up at time scheduled by the wake-up alarm at shutdown. | Real Time Clock has exceeded expected wake-up time as defined by alarms scheduled at shutdown | >= 1 failure to meet scheduled controller wake-up | Control Module wake-up not detected Diagnostic Enable calibration is **CbTRUE** | = CbTRUE | Variable, dependent on scheduled controller wake-up times at shutdown | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Off Timer Performance | P262B | This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test(RaTe).<br><br>Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.<br><br>Range Test(RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active. | Count Up Test:<br><br>Time difference between the current value and the previous value of the timer<br><br>Range Test:<br><br>The variation of the HWIO timer and mirror timer is | > 1.50 seconds<br><br>> 0.25%. | | | Count Up Test: 4 failures out of 20 samples<br><br>1 sec / sample<br><br>Continuous while run/crank is not active and until controller sleep occurs<br><br>Range Test: Once or twice per trip, performed when controller shutdown is initiated or run/ crank becomes active | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Security Peripheral Performance | P3186 | This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable. | MAC verification has falsely passed a configurable number of times. | 3.00 | Calibration enable | = CbTRUE | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication Bus A Off | U0073 | This DTC monitors for a BUS A off condition | Bus off failures equals or exceeds<br><br>before the sample time of is reached | 3 counts (equivalent to 600.01 milliseconds)<br><br>1,000.01 milliseconds | General Enable Criteria:<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or | >=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts<br><br>CbFALSE (CbTRUE indicates enabled) | Diagnostic runs in 10 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With TCM | U0101 | This DTC monitors for a loss of communication with the Transmission Control Module. | Message is not received from controller for<br><br>Message $02E<br><br>Message $031<br><br>Message $452 | <br><br>>10,031.25 milliseconds<br><br>>10,031.25 milliseconds<br><br>>12,500.00 milliseconds | General Enable Criteria:<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller | <br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts | Diagnostic runs in 10 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | CbFALSE (CbTRUE indicates enabled)<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Gateway A | U0146 | This DTC monitors for a loss of communication with Gateway A. | Message is not received from controller for<br><br>Message $425<br><br>Message $427<br><br>Message $20D<br><br>Message $209<br><br>Message $561<br><br>Message $562 | <br><br>> 12,500.00 milliseconds<br><br>> 12,500.00 milliseconds<br><br>> 10,625.00 milliseconds<br><br>> 10,250.00 milliseconds<br><br>> 12,500.00 milliseconds<br><br>> 12,500.00 milliseconds | General Enable Criteria:<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller | <br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts | Diagnostic runs in 10 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | CbFALSE (CbTRUE indicates enabled)<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Battery Monitor Module | U01B0 | This DTC monitors for a loss of communication with the Battery Monitor Module on the LIN bus. | Message is not received from device for<br><br>IBSAmpHrChrg_Rsp_PDU<br><br>IBSAmpHrDisChrg_Rsp_PDU<br><br>IBSBattCrnkData_Rsp_PDU<br><br>IBSBattLINOffData_Rsp_PDU<br><br>IBSBattStatusData_Rsp_PDU<br><br>IBSCfgWakeupData_Rsp_PDU<br><br>IBSCurrentFOMData_Rsp_PDU<br><br>IBSDiagDet_Rsp_PDU<br><br>IBSMeasuredTemp_Rsp_PDU<br><br>IBSMinCrnkData_Rsp_PDU<br><br>IBSMVISOFData_Rsp_PDU<br><br>IBSSOCData_Rsp_PDU<br><br>IBSVoltageFOMData_Rsp | <br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=10,725.00 milliseconds<br><br>>=10,725.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=10,725.00 milliseconds<br><br>>=12,600.00 milliseconds<br><br>>=12,600.00 | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br><br>Slave is calibrated as present<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory: | <br><br>CbTRUE (CbTRUE indicates enabled)<br><br>CbTRUE (CbTRUE indicates enabled)<br><br>CbTRUE (CbTRUE indicates present)<br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts | LIN bus communication executes in 250ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | _PDU | milliseconds | Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | CbFALSE (CbTRUE indicates enabled)<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From ECM/ PCM | U0401 | This DTC monitors for an error in communication with the ECM. | Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: | | Time since power-up reset, running reset, recovery from under/over voltage condition | >= 5,000 milliseconds | Executes in 10ms loop. | Type B, 2 Trips |
| | | | | | All the following conditions are met for | >= 3,000 milliseconds | | |
| | | | ESP.ARC: | 8 fail counts out of 10 sample counts | Partial Network is active | | | |
| | | | ECXCI1_ARC: | 8 fail counts out of 10 sample counts | Power Mode | = Run | | |
| | | | | | Battery Voltage | >11.00 Volts | | |
| | | | DRCDNDP_ARC: | 8 fail counts out of 10 sample counts | | | | |
| | | | PSP.ARC: | 8 fail counts out of 10 sample counts | | | | |
| | | | VSADP_ARC: | 8 fail counts out of 10 sample counts | | | | |
| | | | OATP_ARC: | 8 fail counts out of 10 sample counts | | | | |
| | | | ESP_MAC: | 14 fail counts out of 18 sample counts | | | | |
| | | | DRCDNDP_MAC: | 14 fail counts out of 18 sample counts | | | | |
| | | | PSP_MAC: | 14 fail counts out of 18 sample counts | | | | |
| | | | VSADP_MAC: | 14 fail counts out of 18 sample counts | | | | |
| | | | OATP_MAC: | 14 fail counts out of 18 sample counts | | | | |
| | | | | 8 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | VSANDP_ARC:<br><br>VSANDP_MAC:<br><br>SD81P_ARC:<br><br>SD81P_MAC: | 10 sample counts<br><br>14 fail counts out of 18 sample counts<br><br>8 fail counts out of 10 sample counts<br><br>14 fail counts out of 18 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Transmission Control Module | U0402 | This DTC monitors for an error in communication with the TCM. | Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:<br><br>TEGP.ARC:<br><br>TEGP_MAC: | 15 fail counts out of 16 sample counts<br><br>15 fail counts out of 16 sample counts | Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All the following conditions are met for<br><br>Partial Network is active<br><br>Power Mode<br><br>Battery Voltage | >= 5,000 milliseconds<br><br>>= 3,000 milliseconds<br><br>= Run<br><br>>11.00 Volts | Executes in 10ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Brake System Control Module | U0418 | This DTC monitors for an error in communication with the BSCM. | Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:<br><br>DMCP.ARC:<br><br>DMCP_MAC:<br><br>EPBSP_ARC:<br><br>EPBSP_MAC: | 8 fail counts out of 10 sample counts<br><br>14 fail counts out of 18 sample counts<br><br>15 fail counts out of 16 sample counts<br><br>15 fail counts out of 16 sample counts | Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All the following conditions are met for<br><br>Partial Network is active<br><br>Power Mode<br><br>Battery Voltage | >= 5,000 milliseconds<br><br>>= 3,000 milliseconds<br><br>= Run<br><br>>11.00 Volts | Executes in 10ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Gateway A | U0447 | This DTC monitors for an error in communication with the CGM. | Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:<br><br>BSPMP_ARC:<br><br>BSPMP_MAC: | 15 fail counts out of 16 sample counts<br><br>15 fail counts out of 16 sample counts | Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All the following conditions are met for<br><br>Partial Network is active<br><br>Power Mode<br><br>Battery Voltage | >= 5,000 milliseconds<br><br>>= 3,000 milliseconds<br><br>= Run<br><br>>11.00 Volts | Executes in 10ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Body Control Module Local Interconnect Network 9 | U152D | This DTC monitors for a loss of communication on the LIN bus. | Loss of Communication Method:<br>The total number of diagnostic enabled slave nodes on LIN Bus<br><br>Or<br><br>LIN channel Wakeup Method:<br><br>LIN channel wakeup repetition counter | = Total number of slave nodes on LIN Bus that have reported lost communications DTCs<br><br>>= 10 counts | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled | CbTRUE (CbTRUE indicates enabled)<br><br>CbTRUE (CbTRUE indicates enabled)<br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts<br><br>CbFALSE (CbTRUE | LIN bus communication executes in 250ms loop.<br><br>Dependent on bus loading. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | indicates enabled)<br><br><br><br><br><br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Brake System Control Module 1 on CAN Bus 2 | U1610 | This DTC monitors for a Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by the BCM | Message is not received from controller for<br><br>Message $211<br><br>Message $21B<br><br>Message $42A<br><br>Message $012<br><br>Message $415<br><br>Message $417<br><br>Message $4B5<br><br>Message $028 | <br><br>>10,625.00 milliseconds<br><br>>10,625.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>10,025.00 milliseconds<br><br>>10,250.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>10,025.00 milliseconds | General Enable Criteria:<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller | <br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts | Diagnostic runs in 10 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | CbFALSE (CbTRUE indicates enabled)<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Engine Control Module on CAN Bus 2 | U1611 | This DTC monitors for a Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the BCM. | Message is not received from controller for<br><br>Message $011<br><br>Message $01C<br><br>Message $01D<br><br>Message $213<br><br>Message $21D<br><br>Message $227<br><br>Message $229<br><br>Message $22A<br><br>Message $41D<br><br>Message $499<br><br>Message $4BB<br><br>Message $4BC<br><br>Message $4C1 | <br><br>>10,031.25 milliseconds<br><br>>10,031.25 milliseconds<br><br>>10,031.25 milliseconds<br><br>>10,250.00 milliseconds<br><br>>10,250.00 milliseconds<br><br>>10,625.00 milliseconds<br><br>>10,250.00 milliseconds<br><br>>10,625.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>11,250.00 milliseconds | General Enable Criteria:<br><br>Time since power-up reset, running reset, recovery from under/over voltage condition<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Controller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller | <br><br>>=5,000 milliseconds<br><br>>=3,000 milliseconds<br><br>>11.00 Volts<br><br><=18.00Volts | Diagnostic runs in 10 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Message $214<br><br>Message $4BD<br><br>Message $254<br><br>Message $59A | >10,625.00 milliseconds<br><br>>12,500.00 milliseconds<br><br>>10,625.00 milliseconds<br><br>>10,625.00 milliseconds | If power mode = Run/Propulsion/Start:<br><br>Power Mode is run<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | CbFALSE (CbTRUE indicates enabled)<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned / Authoritative Counter At Maximum | U1960 | This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value | During controller initialization:<br><br>IF (Any Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(Any Authoritative Counter is at MAX value)<br><br>During controller operation:<br><br>IF (A Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(An Authoritative Counter is at MAX value) | | Calibration enable | = CbTRUE | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Security Peripheral Performance | U1961 | This DTC indicates that the ECU security peripheral has reported that it has failed. | The ECU security peripheral reports that the security peripheral hardware has failed. | | Calibration enable | = CbTRUE | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable to Authenticate Serial Data Message | U1962 | This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle. | Message authentication on a single key slot has failed a configurable number of times. | 60 | Calibration enable | = CbTRUE | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Input Power Circuit A/B Correlation | U3018 | This diagnostic verifies that both (A and B) control module input power voltage sensors (when there are two) are neither inappropriately high nor low. It compares the sensed control module voltage A with sensed control module voltage B. If the absolute value of the difference between voltage A and B is greater than the failure threshold for sufficient time, the diagnostic will fail. | Difference between 12V Battery Power Circuit A and 12V Battery Power Circuit B | > 4.00V | Control Module Input Power Circuit A/B Correlation Diagnostic Enable calibration is **CbTRUE**<br><br>12V Starter Engaged | = CbTRUE<br><br>= FALSE | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| CGM Battery Voltage Low Detected | B2B11 | This monitoring checks the system voltage and sets a fault if it is below 7.0V with a calibratable X of Y debounce strategy. | Vehicle Supply Voltage<br>with a debounce strategy of<br>X<br>of<br>Y | <7.0+/- 0.5V<br><br>= 320<br><br>= 400 | Vehicle Power Mode<br>FOR<br><br>Any participating Partial Network<br>Control module operational software | = Propulsion<br>>= 5 sec<br><br>= Active<br>= Executing | 4[sec] for pass<br>min 3.2[sec] for fail | TypeC- No MIL |
| Bus-Off detected on Communication CAN Bus 1 | U1002 | This fault is set if Communication CAN Busi enters the Bus-Off state | Bus Off Event on CAN Bus 1<br>FOR | = TRUE<br>>=2.1 seconds | Vehicle Supply Voltage<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br><br>= Active<br>>= k_Control Module Communication Bus Off Power Mode Time | 100[msec] for pass<br>2.1[sec] for fail | Type B<br>2 Trips |
| Bus-Off detected on Communication CAN Bus 2 | U2413 | This fault is set if Communication CAN Bus 2 enters the Bus-Off state | Bus Off Event on CAN Bus 2<br>FOR | = TRUE<br>>=2.1 seconds | Vehicle Supply Voltage<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br><br>= Active<br>>= k_Control Module Communication Bus Off Power Mode Time | 100[msec] for pass<br>2.1[sec] for fail | Type B<br>2 Trips |
| Bus-Off detected on Communication CAN Bus 3 | U1004 | This fault is set if Communication CAN Bus 3 enters the Bus-Off state | Bus Off Event on CAN Bus 3<br>FOR | = TRUE<br>>=2.1 seconds | Vehicle Supply Voltage<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br><br>= Active<br>>= k_Control Module Communication Bus Off Power Mode Time | 100[msec] for pass<br>2.1[sec] for fail | Type B<br>2 Trips |
| Bus-Off detected on Communication CAN Bus 5 | U1006 | This fault is set if Communication CAN Bus 5 enters the Bus-Off state | Bus Off Event on CAN Bus 5<br>FOR | = TRUE<br>>=2.1 seconds | Vehicle Supply Voltage<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br><br>= Active<br>>= k_Control Module Communication Bus Off Power Mode Time | 100[msec] for pass<br>2.1[sec] for fail | Type B<br>2 Trips |
| Internal memory failure on the CGM Detected | B2B12 | This monitoring checks whether a double bit ECCerror has occurred in code flash or RAM. This fault is set if an ECCerror has occurred. | ECCError Detected | = TRUE | N/A | N/A | 50ms | Type B<br>2 Trips |
| | | This monitoring checks and sets a fault if a defect in the data flash (NVM) is detected. | NVM Fault Detected | = TRUE | N/A | N/A | 1.5 us | |
| Microcontroller Performance Failure Detected | B2B13 | This monitoring shall check the CPUby running an instruction test followed by a register test. | Instruction test failed<br>OR<br>Register test failed | = TRUE<br><br>= TRUE | N/A | N/A | 1.5 us | Type B<br>2 Trips |
| | | This monitoring shall check whether any clock monitoring interrupts have occurred. If any clock monitoring interrupts have occurred this fault shall be set. | Clock Monitoring Interrupt Occurred | = TRUE | N/A | N/A | | |
| Lossof Communication with the BCM Detected | U2203 | This monitoring shall check a supervised message from the BCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | 1 Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lossof Communication with the EBCM on CAN 1 Detected | U2418 | This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 1. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the EBCM on CAN 2 Detected | U2419 | This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the ECM Detected on CAN 2 | U241C | This monitoring shall check a supervised message from the ECM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the ECM Detected on CAN 3 | U241D | This monitoring shall check a supervised message from the ECM for communication status on CAN channel 3. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the EPSDetected | U2205 | This monitoring shall check a supervised message from the EPSfor communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the HVAC_FP_FDetected | U2209 | This monitoring shall check a supervised message from the HVAC_FP_Ffor communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the SDM Detected | U220C | This monitoring shall check a supervised message from the SDM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > k_Battery Voltage Low Threshold<br>< k_Battery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | 1 Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lossof Communication with the TCCM Detected | U220E | This monitoring shall check a supervised message from the TCCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Lossof Communication with the TCM Detected | U220F | This monitoring shall check a supervised message from the TCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set. | Supervised message not received<br>FOR<br>WHERE<br>nominal periodic rate<br>with an additional delay | = TRUE<br>>= 2.5 x nominal periodic rate<br><br>= 1 second<br>= 4 seconds | Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | > kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= k_Lost Communication Power Mode Time | 6.5 [sec] | Type B<br>2 Trips |
| Central Gateway Module Received Invalid Data From Body Control Module | U137F | This diagnostic monitors invalid data received from the BCM. If /(default = 3) invalid data are received within Y(default = 1.5) seconds, the fault is set. If X+I valid data are received with Yseconds, the fault is cleared. | Invalid BCM data instances<br>WITHIN | >= / (default of 3)<br><= Y(default 1.5) seconds | k_OBD_APP_BCMJ nvalidData_cal<br><br>Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | = True<br><br>> kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= kJ nvalid Data Received from BCM Power Mode Time | 0.75 [sec] min<br>1.5 [sec] max | Type B<br>2 Trips |
| Central Gateway Module Key Table Not Provisioned | U1982 | Upon start up, if the key table has not been provisioned, this fault is set. If the table is, or becomes, provisioned, it is cleared. | Key table is provisioned | = False | k_OBD_APP_KeyNotPovisioned_cal<br><br>Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | = True<br><br>> kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= k_Key Table Not Provisioned Diagnostic Time | 150 [msec] min<br>5.0 [sec] max<br>(startup) | Type B<br>2 Trips |
| Central Gateway Module Security Peripheral Performance | U1983 | This diagnostic monitors the security peripheral and if the security peripheral indicates a fault or the key table is not provisioned, then this fault is set. Otherwise, it is cleared. | Security peripheral has a fault<br>OR<br>Key table is provisioned | = True<br><br>= False | k_OBD_APP_SecurityPeripheralPerformance_cal<br><br>Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | = True<br><br>> kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= 5 seconds | 150 [msec] min<br>5.0 [sec] max<br>(startup) | Type B<br>2 Trips |
| Central Gateway Module Unable To Authenticate Serial Data Message | U1984 | This diagnostic monitors for serial data message authentication failures. If X (default = 3) failures occur on a particular key slot, the fault is set. If X-I messages on a failed key slot authenticate, the fault is cleared. | Serial data authentication failure instances on a key slot | >= / (default of 3) | k_OBD_APP_UnableToAuthenticateSerialData_cal<br><br>Vehicle Supply Voltage<br>AND<br><br>Any participating Partial Network<br>FOR | = True<br><br>> kJBattery Voltage Low Threshold<br>< kJBattery Voltage High Threshold<br><br>= Active<br>>= 2 seconds | 30 [msec] min<br>0.72 [sec] max<br>2.0 [sec] on startup | Type B<br>2 Trips |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECUIdentification List NVM Corruption | U197C | ECUIdentification List NVM Corruption Diagnostic | When the checksum of the memory that stores the learned content no longer matches the stored checksum. | = TRUE | Vehicle Supply Voltage<br><br><br>U197700 ECUIdentification Self Learn Not Completed DTC | > k_Battery Voltage Low Threshold = >=7V<br>< k_Battery Voltage High Threshold = >=30V<br><br>= Not Set | 1.5 [sec] min<br>5 [sec] max<br>on startup | Type B<br>2 Trips |
| Self-Learn Did Not Execute | U197B | Self Learn Did not Execute Diagnostic | Unlearn all ECU'sor do not self learn any of the ECU's | = TRUE | System Power mode<br><br>Any participating Partial Network<br>FOR | = OFF<br><br>= Active<br>>= 2 seconds | 150 [msec] min<br>500 [msec] max<br>on startup | Type B<br>2 Trips |
| Self-Learn Invalid Due to VIN Mismatch | U197D | Self Learn Invalid Due to VIN Mismatch Diagnostic | When all 17 characters of the DID $F190 i.e. Vehicle Identification Number do not match all 17 characters of VIN being broadcasted.<br>OR<br>When last 8 characters of the DID $F190 i.e. Vehicle Identification Number do not match the last 8 characters of VIN being broadcasted. | = TRUE<br><br><br><br>= TRUE | When last 8 digits of Vehicle Identification Number (i.e. DID $F190) are checked<br>OR<br><br>When all 17 digits of Vehicle Identification Number (i.e. DID $F190) are checked<br>AND<br><br>U300251 Vehicle Identification Number - Not Programmed DTC | = True<br><br><br><br>=True<br><br><br><br>= Not Set | 500 [msec] min<br>5 [sec] max<br>on startup | Type B<br>2 Trips |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS OPEN FRONT LEFT | C0502 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris ASIC sets FL Open Sensor bit = TRUE when High side current < 3.5mA | Polaris ASIC Open Sensor Bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSOPEN FRONTRIGHT | C0508 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris ASIC sets FR Open Sensor bit = TRUE when High side current < 3.5mA | Polaris ASIC Open Sensor Bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSOPENREARLEFT | C050E | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris ASIC sets RL Open Sensor bit = TRUE when High side current < 3.5mA | Polaris ASIC Open Sensor Bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSOPENREARRIGHT | C0514 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris ASIC sets RR Open Sensor bit = TRUE when High side current < 3.5mA | Polaris ASIC Open Sensor Bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSSHORTFRONTLEFT | C0603 | This monitor checks if:<br>• HS Shorted to Battery<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXHS OC = TRUE when High side current > 40mA | High side over current bit= True<br>OR<br>High side short to battery bit= True<br>OR<br>Low side over current bit= True<br>OR<br>Low side short to ground bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSS_SHORT_FRONT_RIGHT | C0509 | This monitor checks if:<br>• HS Shorted to Battery<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXHS OC = TRUE when High side current > 40mA | High side over current bit= True<br>OR<br>High side short to battery bit= True<br>OR<br>Low side over current bit= True<br>OR<br>Low side short to ground bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSSHORTREARLEFT | C050F | This monitor checks if:<br>• HS Shorted to Battery<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXHS OC = TRUE when High side current > 40mA | High side over current bit= True<br>OR<br>High side short to battery bit= True<br>OR<br>Low side over current bit= True<br>OR<br>Low side short to ground bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSSSHORT-REARRIGHT | C0515 | This monitor checks if:<br>• HS Shorted to Battery<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXHS OC = TRUE when High side current > 40mA | High side over current bit= True<br>OR<br>High side short to battery bit= True<br>OR<br>Low side over current bit= True<br>OR<br>Low side short to ground bit= True | • Wheel speed sensor supply is enabled | 100 ms | Type A MIL Illumination. |
| WSS_LS_SHORT_TO_GND_FRONT_LEFT | C0502 | This monitor checks if:<br>• LS Shorted to Ground<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Wheel speed sensor supply is enabled<br>• Tested only during power up or after clear DTC. | 100 ms | Type A MIL Illumination. |
| WSS_LS_SH ORT_TO_GN D_F RONT_RI GHT | C0508 | This monitor checks if:<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Wheel speed sensor supply is enabled<br>• Tested only during power up or after clear DTC. | 100 ms | Type A MIL Illumination. |
| WSS_LS_SHORT_TO_GND_REAR_LEFT | C050E | This monitor checks if:<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Wheel speed sensor supply is enabled<br>• Tested only during power up or after clear DTC. | 100 ms | Type A MIL Illumination. |
| WSS_LS_SHORT_TO_GND_REAR_RIGHT | C0514 | This monitor checks if:<br>• LS Shorted to Battery<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor<br>• Defective printed circuit board<br>• Defective Polaris ASIC | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Polaris Asic sets XXLS SHORT TO GROUND spi bit= TRUE | • Wheel speed sensor supply is enabled<br>• Tested only during power up or after clear DTC. | 100 ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS_MISSING_FRONT_LEFT | C0505 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | Missing Wheel Speed Sensor<br><br>If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased.<br>The failsafe will not run in case<br>• exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench).<br>• the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode.<br><br>Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 krVh or the vehicle is in standstill ( all sensors lower than 1.5 km/h)<br><br>Fault maturation time for one Wss missing:<br>a. TC active: 60 sec<br>b. ABS or MOCO not active: 3 sec.<br>c. ABS or MOCO active: 15 sec<br><br>Fault maturation time for two Wss missing:<br>a. ABS or MOCO active: 15 sec<br>b. If ABS or MOCO not active:<br>1. If undriven wheel is moving then:<br>Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 | If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 krVh and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased. | • Wheel speed sensor supply is enabled.<br>• No Ohmic wheel speed sensor failure present.<br>• No Wss Erratic or Wss Dropout fault present<br>• At least one WSS > 6kph<br>• No excessive high or low voltage<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 3-120s depending on number of missing wss and situation | Type B. MIL Illumination. |
| WSS_MISSING_FRONT_RIGHT | C050B | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | Missing Wheel Speed Sensor<br><br>If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased.<br>The failsafe will not run in case<br>• exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench).<br>• the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode.<br><br>Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 krVh or the vehicle is in standstill ( all sensors lower than 1.5 km/h)<br><br>Fault maturation time for one Wss missing:<br>a. TC active: 60 sec<br>b. ABS or MOCO not active: 3 sec.<br>c. ABS or MOCO active: 15 sec<br><br>Fault maturation time for two Wss missing:<br>a. ABS or MOCO active: 15 sec<br>b. If ABS or MOCO not active:<br>1. If undriven wheel is moving then:<br>Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec.<br>2. If driven wheel is moving then:<br>Fault maturation if velocity greater than | If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 krVh and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased. | • Wheel speed sensor supply is enabled.<br>• No Ohmic wheel speed sensor failure present.<br>• No Wss Erratic or Wss Dropout fault present<br>• At least one WSS > 6kph<br>• No excessive high or low voltage<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 3-120s depending on number of missing wss and situation | Type B. MIL Illumination. |
| WSS_MISSING_REAR_LEFT | C0511 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | Missing Wheel Speed Sensor<br><br>If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased.<br>The failsafe will not run in case<br>• exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench).<br>• the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode.<br><br>Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 krVh or the vehicle is in standstill ( all sensors lower than 1.5 km/h)<br><br>Fault maturation time for one Wss missing:<br>a. TC active: 60 sec<br>b. ABS or MOCO not active: 3 sec.<br>c. ABS or MOCO active: 15 sec<br><br>Fault maturation time for two Wss missing:<br>a. ABS or MOCO active: 15 sec<br>b. If ABS or MOCO not active:<br>1. If undriven wheel is moving then:<br>Fault maturation if velocity greater than | If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 krVh and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased. | • Wheel speed sensor supply is enabled.<br>• No Ohmic wheel speed sensor failure present.<br>• No Wss Erratic or Wss Dropout fault present<br>• At least one WSS > 6kph<br>• No excessive high or low voltage<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 3-120s depending on number of missing wss and situation | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS MISSING REAR RIGHT | C0517 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | Missing Wheel Speed Sensor<br><br>If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased.<br>The failsafe will not run in case<br>• exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench).<br>• the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode.<br><br>Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 krVh or the vehicle is in standstill ( all sensors lower than 1.5 km/h)<br><br>Fault maturation time for one Wss missing:<br>a. TC active: 60 sec<br>b. ABS or MOCO not active: 3 sec.<br>c. ABS or MOCO active: 15 sec<br><br>Fault maturation time for two Wss missing:<br>a. ABS or MOCO active: 15 sec<br>b. If ABS or MOCO not active:<br>1. If undriven wheel is moving then:<br>Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 | If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs.<br>The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 krVh and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster.<br>The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased. | • Wheel speed sensor supply is enabled.<br>• No Ohmic wheel speed sensor failure present.<br>• No Wss Erratic or Wss Dropout fault present<br>• At least one WSS > 6kph<br>• No excessive high or low voltage<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 3-120s depending on number of missing wss and situation | Type B. MIL Illumination. |
| WSS_ERRATIC_FRONT_LEFT | C0504 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring.<br>• Electro-magnetic interference (EMI). | Erratic Wheel Speed Sensor<br><br>• If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set.<br>• If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault.<br>• Counter: 1000<br>• Monitor Rate: 5ms<br>• Fault maturation time (Goal): 200ms | \|Wheel_Accel\| > 491 $m/s^2$ | • reference_vehicle_velocity > 3.58 m/s<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | Goal: 40000<br>Continuous failure Time: 200ms | Type A. MIL Illumination. |
| WSS_ERRATIC_FRONT_RIGHT | C050A | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring.<br>• Electro-magnetic interference (EMI). | Erratic Wheel Speed Sensor<br><br>• If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set.<br>• If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault.<br>• Counter: 1000<br>• Monitor Rate: 5ms<br>• Fault maturation time (Goal): 200ms | \|Wheel_Accel\| > 491 $m/s^2$ | • reference_vehicle_velocity > 3.58 m/s<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | Goal: 40000<br>Continuous failure Time: 200ms | Type A. MIL Illumination. |
| WSS_ERRATIC_REAR_LEFT | C0510 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring.<br>• Electro-magnetic interference (EMI). | Erratic Wheel Speed Sensor<br><br>• If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set.<br>• If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault.<br>• Counter: 1000<br>• Monitor Rate: 5ms<br>• Fault maturation time (Goal): 200ms | \|Wheel_Accel\| > 491 $m/s^2$ | • reference_vehicle_velocity > 3.58 m/s<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | Goal: 40000<br>Continuous failure Time: 200ms | Type A. MIL Illumination. |
| WSS_ERRATIC_REAR_RIGHT | C0516 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring.<br>• Electro-magnetic interference (EMI). | Erratic Wheel Speed Sensor<br><br>• If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set.<br>• If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault.<br>• Counter: 1000<br>• Monitor Rate: 5ms<br>• Fault maturation time (Goal): 200ms | \|Wheel_Accel\| > 491 $m/s^2$ | • reference_vehicle_velocity > 3.58 m/s<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | Goal: 40000<br>Continuous failure Time: 200ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS DROPOUT FRONT LEFT | C0505 | This monitor checks if:<br>• Defective wheel speed sensor.<br>• Wheel speed sensor not mounted correctly.<br>• Defective wheel speed sensor wiring harness.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring. | •Wheel Speed Sensor Dropout<br><br>• When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br>• Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time.<br>• If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30krrVh a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault.<br>• Counter: Count 1-up<br>• Monitor Rate: 7ms | When wheel speed sensor acceleration is detected that is above 392 rrVs/s, a timer is initialized to hold offwheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br><br>If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 rrVs for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault | • Wheel speed sensor supply is enabled.<br>• No ohmic wheel speed sensor failure present<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 40 ms | Type B. MIL Illumination. |
| WSS DROPOUT FRONT RIGHT | C050B | This monitor checks if:<br>• Defective wheel speed sensor.<br>• Wheel speed sensor not mounted correctly.<br>• Defective wheel speed sensor wiring harness.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring. | •Wheel Speed Sensor Dropout<br><br>• When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br>• Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time.<br>• If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30krrVh a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault.<br>• Counter: Count 1-up<br>• Monitor Rate: 7ms | When wheel speed sensor acceleration is detected that is above 392 rrVs/s, a timer is initialized to hold offwheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br><br>If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 rrVs for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault | • Wheel speed sensor supply is enabled.<br>• No ohmic wheel speed sensor failure present<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 40 ms | Type B. MIL Illumination. |
| WSS_DROPOUT_REAR_LEFT | C0511 | This monitor checks if:<br>• Defective wheel speed sensor.<br>• Wheel speed sensor not mounted correctly.<br>• Defective wheel speed sensor wiring harness.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring. | •Wheel Speed Sensor Dropout<br><br>• When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br>• Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time.<br>• If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30krrVh a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault.<br>• Counter: Count 1-up<br>• Monitor Rate: 7ms | When wheel speed sensor acceleration is detected that is above 392 rrVs/s, a timer is initialized to hold offwheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br><br>If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 rrVs for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor. | • Wheel speed sensor supply is enabled.<br>• No ohmic wheel speed sensor failure present<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 40 ms | Type B. MIL Illumination. |
| WSS_DROPOUT_REAR_RIGHT | C0517 | This monitor checks if:<br>• Defective wheel speed sensor.<br>• Wheel speed sensor not mounted correctly.<br>• Defective wheel speed sensor wiring harness.<br>• Missing tooth or teeth on the wheel speed sensor tone-ring. | •Wheel Speed Sensor Dropout<br><br>• When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br>• Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time.<br>• If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30krrVh a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault.<br>• Counter: Count 1-up<br>• Monitor Rate: 7ms | When wheel speed sensor acceleration is detected that is above 392 rrVs/s, a timer is initialized to hold offwheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity.<br><br>If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 rrVs for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault | • Wheel speed sensor supply is enabled.<br>• No ohmic wheel speed sensor failure present<br><br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive | 40 ms | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS FAST MISSING FRONT LEFT | C0505 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | • Fast Missing Wheel Speed Sensor<br><br>• This failsafe is only active from<br>• Ignition On until the vehicle reaches<br>• 15km/h for the first time.<br><br>• During this time the wheel speeds and wheel<br>• speed pulses are monitored | The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented.<br><br>At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not.<br>The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h.<br><br>If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code. | • Wheel speed sensor supply is enabled.<br>• No other wheel speed sensor failure present<br>• 15 km/h not reached this ignition cycle<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive<br>SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched | 1 count | Type B. MIL Illumination. |
| WSSFASTMISSINGFRONTRIGHT | C050B | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | • Fast Missing Wheel Speed Sensor<br><br>• This failsafe is only active from<br>• Ignition On until the vehicle reaches<br>• 15km/h for the first time.<br><br>• During this time the wheel speeds and wheel<br>• speed pulses are monitored | The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented.<br><br>At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not.<br>The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h.<br><br>If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code. | • Wheel speed sensor supply is enabled.<br>• No other wheel speed sensor failure present<br>• 15 km/h not reached this ignition cycle<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive<br>SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched | 1 count | Type B. MIL Illumination. |
| WSS_FAST_MISSING_REAR_LEFT | C0511 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring.<br><br>(should come from FMEA) | • Fast Missing Wheel Speed Sensor<br><br>• This failsafe is only active from<br>• Ignition On until the vehicle reaches<br>• 15km/h for the first time.<br><br>• During this time the wheel speeds and wheel<br>• speed pulses are monitored | The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented.<br><br>At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not.<br>The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h.<br><br>If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code. | • Wheel speed sensor supply is enabled.<br>• No other wheel speed sensor failure present<br>• 15 km/h not reached this ignition cycle<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive<br>SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched | 1 count | Type B. MIL Illumination. |
| WSS_FAST_MISSING_REAR_RIGHT | C0517 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Wheel speed sensor to tone-ring gap out of tolerance.<br>• Demagnetized tone-ring. | • Fast Missing Wheel Speed Sensor<br><br>• This failsafe is only active from<br>• Ignition On until the vehicle reaches<br>• 15km/h for the first time.<br><br>• During this time the wheel speeds and wheel<br>• speed pulses are monitored | The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented.<br><br>At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not.<br>The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h.<br><br>If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code. | • Wheel speed sensor supply is enabled.<br>• No other wheel speed sensor failure present<br>• 15 km/h not reached this ignition cycle<br>• Diagnostic Mode Inactive<br>• Emissions Rolls Test Inactive<br>SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched | 1 count | Type B. MIL Illumination. |
| WSS_TOO_FAST_SENSOR_FRONT_LEFT | C0505 | This monitor checks if:<br>- Wheel speed sensor not mounted correctly.<br>- Wheel speed sensor to tone-ring gap out of ti-Jaronna | If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph(1.5 km/h) the fault is detected. | If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched. | • No electrical failure is currently present | 40 msec | Type B. MIL Illumination. |
| WSS_TOO_FAST_SENSOR_FRONT_RIGHT | C050B | This monitor checks if:<br>- Wheel speed sensor not mounted correctly.<br>- Wheel speed sensor to tone-ring gap out of +,i>!nrnnr'o | If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph(1.5 km/h) the fault is detected. | If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched. | • No electrical failure is currently present | 40 msec | Type B. MIL Illumination. |
| WSS_TOO_FAST_SENSOR_REAR_LEFT | C0511 | This monitor checks if:<br>- Wheel speed sensor not mounted correctly.<br>- Wheel speed sensor to tone-ring gap out of ti-ilaronna | If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph(1.5 km/h) the fault is detected. | If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched. | • No electrical failure is currently present | 40 msec | Type B. MIL Illumination. |
| WSS_TOO_FAST_SENSOR_REAR_RIGHT | C0517 | This monitor checks if:<br>- Wheel speed sensor not mounted correctly.<br>- Wheel speed sensor to tone-ring gap out of +,i>!nrnnr'o | If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph(1.5 km/h) the fault is detected. | If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched. | • No electrical failure is currently present | 40 msec | Type B. MIL Illumination. |
| WSS_SHADOWZONE_FRONT_LEFT | C0501 | This monitor checks if:<br>• High resistance of wiring harness<br>• High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current) | • Detection is handled by the Polaris ASIC | Polaris ASIC Low Grey Zone Detect bit = True<br>(The low grey zone is 7 to 14mA )<br>or<br>Polaris ASIC High Grey Zone Detect bit = True<br>(The high grey zone is 14 to 28mA) | • No electrical failure is currently present | 100 ms | Type A. MIL Illumination. |
| WSS_SHADOWZONE_FRONT_RIGHT | C0507 | This monitor checks if:<br>• High resistance of wiring harness<br>• High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current) | • Detection is handled by the Polaris ASIC | Polaris ASIC Low Grey Zone Detect bit = True<br>(The low grey zone is 7 to 14mA )<br>or<br>Polaris ASIC High Grey Zone Detect bit = True<br>(The high grey zone is 14 to 28mA) | • No electrical failure is currently present | 100 ms | Type A. MIL Illumination. |
| WSS_SHADOWZONE_REAR_LEFT | C050D | This monitor checks if:<br>• High resistance of wiring harness<br>• High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current) | • Detection is handled by the Polaris ASIC | Polaris ASIC Low Grey Zone Detect bit = True<br>(The low grey zone is 7 to 14mA )<br>or<br>Polaris ASIC High Grey Zone Detect bit = True<br>(The high grey zone is 14 to 28mA) | • No electrical failure is currently present | 100 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS SHADOWZONE REAR RIGHT | C0513 | This monitor checks if:<br>• High resistance of wiring harness<br>• High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current) | • Detection is handled by the Polaris ASIC | Polaris ASIC Low Grey Zone Detect bit = True<br>(The low grey zone is 7 to 14mA )<br>or<br>Polaris ASIC High Grey Zone Detect bit = True<br>(The high grey zone is 14 to 28mA) | • No electrical failure is currently present | 100 ms | Type A MIL Illumination. |
| WSS HS OC FRONT LEFT | C0503 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | Polaris ASIC sets any of these bits = TRUE | Polaris ASIC sets HS Over Current = TRUE High Side Over Current (HS current > 40mA) | • Wheel speed sensor supply is enabled.<br>• High Side failsafe is not blocked | 100 msec | Type A MIL Illumination. |
| WSS_HS_OC_FRONT_RIGHT | C0509 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | Polaris ASIC sets any of these bits = TRUE | Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA) | • Wheel speed sensor supply is enabled.<br>• High Side failsafe is not blocked | 100 msec | Type A MIL Illumination. |
| WSSHSOCREARLEFT | C050F | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | Polaris ASIC sets any of these bits = TRUE | Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA) | • Wheel speed sensor supply is enabled.<br>• High Side failsafe is not blocked | 100 msec | Type A MIL Illumination. |
| WSS_HS_OC_REAR_RIGHT | C0515 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | Polaris ASIC sets any of these bits = TRUE | Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA) | • Wheel speed sensor supply is enabled.<br>• High Side failsafe is not blocked | 100 msec | Type A MIL Illumination. |
| WSS_UNDERVOLTAGEFRONTLEFT | P0562 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | • Detection is handled by the Polaris ASIC | Polaris ASIC sets WSS Undervoltage disable bit = TRUE<br>Note: This bit will activate when Battery voltage drops below 5.6 V | • Wheel speed sensor supply is enabled<br>• No voltage DTCs are set | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| WSS_UNDER_VOLTAGE_FRONT_RIGHT | P0562 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | • Detection is handled by the Polaris ASIC | Polaris ASIC sets WSS Undervoltage disable bit = TRUE<br>Note: This bit will activate when Battery voltage drops below 5.6 V | • Wheel speed sensor supply is enabled<br>• No voltage DTCs are set | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| WSS_UNDER_VOLTAGE_REAR_LEFT | P0562 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | • Detection is handled by the Polaris ASIC | Polaris ASIC sets WSS Undervoltage disable bit = TRUE<br>Note: This bit will activate when Battery voltage drops below 5.6 V | • Wheel speed sensor supply is enabled<br>• No voltage DTCs are set | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| WSS_UNDER_VOLTAGE_REAR_RIGHT | P0562 | This monitor checks if:<br>• Defective wheel speed sensor<br>• Defective wire harness to wheel speed sensor | • Detection is handled by the Polaris ASIC | Polaris ASIC sets WSS Undervoltage disable bit = TRUE<br>Note: This bit will activate when Battery voltage drops below 5.6 V | • Wheel speed sensor supply is enabled<br>• No voltage DTCs are set | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ASIC_DECODE_THREE_LEVEL_FAULT_LF | C0555 | This monitor checks if:<br>• wrong vehicle config file used<br>• misbuild using wrong WSS | Look for ASIC decoding a three level sensor when a two level sensor is configured:<br>Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor<br>or<br>Check for the tp out of range bit received indicates that the | While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_THREE_LEVEL_DATA_READ_FAULT_LF | C0501 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag. | counts up by 1 if the data package received rate from the sensor is > 390ms | • Polaris is initialized<br>• WSS supply voltage is in normal range | 3 count | Type A MIL Illumination. |
| ASIC_TWO_LEVEL_DATA_READ_FAULT_LF | P0606 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag. | The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set afterevery sensor falling edge. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_DECODE_THREE_LEVEL_FAULT_RF | C0556 | This monitor checks if:<br>• wrong vehicle config file used<br>• misbuild using wrong WSS | Look for ASIC decoding a three level sensor when a two level sensor is configured:<br>Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor<br>or<br>Check for the tp out of range bit received indicates that the | While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_THREE_LEVEL_DATA_READ_FAULT_RF | C0507 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag. | counts up by 1 if the data package received rate from the sensor is > 390ms | • Polaris is initialized<br>• WSS supply voltage is in normal range | 3 count | Type A MIL Illumination. |
| ASIC_TWO_LEVEL_DATA_READ_FAULT_RF | P0606 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag. | The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set afterevery sensor falling edge. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_DECODE_THREE_LEVEL_FAULT_LR | C0557 | This monitor checks if:<br>• wrong vehicle config file used<br>• misbuild using wrong WSS | Look for ASIC decoding a three level sensor when a two level sensor is configured:<br>Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor<br>or<br>Check for the tp out of range bit received indicates that the | While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_THREE_LEVEL_DATA_READ_FAULT_LR | C050D | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag. | counts up by 1 if the data package received rate from the sensor is > 390ms | • Polaris is initialized<br>• WSS supply voltage is in normal range | 3 count | Type A MIL Illumination. |
| ASIC_TWO_LEVEL_DATA_READ_FAULT_LR | P0606 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag. | The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set afterevery sensor falling edge. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_DECODE_THREE_LEVEL_FAULT_RR | C0558 | This monitor checks if:<br>• wrong vehicle config file used<br>• misbuild using wrong WSS | Look for ASIC decoding a three level sensor when a two level sensor is configured:<br>Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor<br>or<br>Check for the to out of ranoe bit received indicates that the | While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| ASIC_THREE_LEVEL_DATA_READ_FAULT_RR | C0513 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag. | counts up by 1 if the data package received rate from the sensor is > 390ms | • Polaris is initialized<br>• WSS supply voltage is in normal range | 3 count | Type A MIL Illumination. |
| ASIC_TWO_LEVEL_DATA_READ_FAULT_RR | P0606 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | • When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag. | The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set afterevery sensor falling edge. | • Polaris is initialized<br>• WSS supply voltage is in normal range | 15 msec | Type A MIL Illumination. |
| WSS_3L_INFO_MISSING_FRONT_LEFT | C0555 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.<br>Furthermore it checks the number of received data bits in the transmission.<br>If less than the minimum number of data bits (3) are received, a fault will be latched. | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled<br>• No WSS electrical fault is present<br>• SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present | 250 msec | Type A MIL Illumination. |
| WSS_3L_INFO_MISSING_FRONT_RIGHT | C0556 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.<br>Furthermore it checks the number of received data bits in the transmission.<br>If less than the minimum number of data bits (3) are received, a fault will be latched. | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled<br>• No WSS electrical fault is present<br>• SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present | 250 msec | Type A MIL Illumination. |
| WSS_3L_INFO_MISSING_REAR_LEFT | C0557 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.<br>Furthermore it checks the number of received data bits in the transmission.<br>If less than the minimum number of data bits (3) are received, a fault will be latched. | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled<br>• No WSS electrical fault is present<br>• SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present | 250 msec | Type A MIL Illumination. |
| WSS_3L_INFO_MISSING_REAR_RIGHT | C0558 | This monitor checks if:<br>• Defective system ASIC<br>ASIC data read flag is not updated properly | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. | Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.<br>Furthermore it checks the number of received data bits in the transmission.<br>If less than the minimum number of data bits (3) are received, a fault will be latched. | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled<br>• No WSS electrical fault is present<br>• SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present | 250 msec | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| WSS PARITY FRONT LEFT | C0555 | This monitor checks if:<br>VDA data bits are corrupted | Decodes the additional information of a Philips KM122/1 wheelspeed sensor which is a 3-level VDA compliant sensor. | It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits:<br>0 airgap (1=too large) | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled | 35 msec | Type A MIL Illumination. |
| WSS_PARITY_FRONT_RIGHT | C0556 | This monitor checks if:<br>VDA data bits are corrupted | Decodes the additional information of a Philips KM122/1 wheelspeed sensor which is a 3-level VDA compliant sensor. | It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits:<br>0 airgap (1=too large) | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled | 35 msec | Type A MIL Illumination. |
| WSSPARITYREARLEFT | C0557 | This monitor checks if:<br>VDA data bits are corrupted | Decodes the additional information of a Philips KM122/1 wheelspeed sensor which is a 3-level VDA compliant sensor. | It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits:<br>0 airgap (1=too large) | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled | 35 msec | Type A MIL Illumination. |
| WSSPARITY-REARRIGHT | C0558 | This monitor checks if:<br>VDA data bits are corrupted | Decodes the additional information of a Philips KM122/1 wheelspeed sensor which is a 3-level VDA compliant sensor. | It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits:<br>0 airgap (1=too large) | • Polaris is initialized.<br>• Wheel Speed Sensor supply is enabled | 35 msec | Type A MIL Illumination. |
| WSS_VDA_TP_OUT_OF_RANGE_FRONT_LEFT | C0501 | This monitor checks if:<br>• standstill pulse width out of range<br>• Defective system ASIC | • The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1)<br><br>(3 level WSS only) | • Polaris is initialized<br>• Wheel speed edge or stand still pulse received<br>• WSS supply voltage is in normal range | 15 msec -375ms | Type A MIL Illumination. |
| WSS VDA TP OUT OF RANGE FRONT RIGHT | C0507 | This monitor checks if:<br>• standstill pulse width out of range<br>• Defective system ASIC | • The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1)<br><br>(3 level WSS only) | • Polaris is initialized<br>• Wheel speed edge or stand still pulse received<br>• WSS supply voltage is in normal range | 15 msec -375ms | Type A MIL Illumination. |
| WSS VDA TP OUT OF RANGE REAR LEFT | C050D | This monitor checks if:<br>• standstill pulse width out of range<br>• Defective system ASIC | • The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1)<br><br>(3 level WSS only) | • Polaris is initialized<br>• Wheel speed edge or stand still pulse received<br>• WSS supply voltage is in normal range | 15 msec -375ms | Type A MIL Illumination. |
| WSS_VDA_TP_OUT_OF_RANGE_REAR_RIGHT | C0513 | This monitor checks if:<br>• standstill pulse width out of range<br>• Defective system ASIC | • The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1)<br><br>(3 level WSS only) | • Polaris is initialized<br>• Wheel speed edge or stand still pulse received<br>• WSS supply voltage is in normal range | 15 msec -375ms | Type A MIL Illumination. |
| WSS_STANDSTILL_FAST_FRONT_LEFT | C0501 | This monitor checks if:<br>• Defective system ASIC<br>Standstill VDA transmission too short | • The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and detection rules. Range is from 25 - 475ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_SLOW_FRONT_LEFT | C0501 | This monitor checks if:<br>• Defective system ASIC<br>• Standstill VDA transmission too long | • The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_FAST_FRONT_RIGHT | C0507 | This monitor checks if:<br>• Defective system ASIC<br>Standstill VDA transmission too short | • The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and detection rules. Range is from 25 - 475ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_SLOW_FRONT_RIGHT | C0507 | This monitor checks if:<br>• Defective system ASIC<br>• Standstill VDA transmission too long | • The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_FAST_REAR_LEFT | C050D | This monitor checks if:<br>• Defective system ASIC<br>Standstill VDA transmission too short | • The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and detection rules. Range is from 25 - 475ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_SLOW_REAR_LEFT | C050D | This monitor checks if:<br>• Defective system ASIC<br>• Standstill VDA transmission too long | • The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_FAST_REAR_RIGHT | C0513 | This monitor checks if:<br>• Defective system ASIC<br>Standstill VDA transmission too short | • The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and detection rules. Range is from 25 - 475ms. | Type A MIL Illumination. |
| WSS_STANDSTILL_SLOW_REAR_RIGHT | C0513 | This monitor checks if:<br>• Defective system ASIC<br>• Standstill VDA transmission too long | • The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms. | POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec<br><br>(3 level WSS only) | • Polaris is initialized | Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms. | Type A MIL Illumination. |
| SYS_ASIC_WSS_EDGE_MISMATCH_LF | P0606 | This monitor checks if:<br>• Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault<br>• ASIC outputs shorted to neighboring pins<br>• Open trace on circuit board | The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation. | 1) The micro monitors the number of edges received every loop for plausability (less than a max number).<br><br>2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match. | • Polaris is initialized<br>• No other ASIC faults detected | 25 msec | Type A MIL Illumination. |
| SYS_ASIC_WSS_EDGE_MISMATCH_RF | P0606 | This monitor checks if:<br>• Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault<br>• ASIC outputs shorted to neighboring pins<br>• Open trace on circuit board | The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation. | 1) The micro monitors the number of edges received every loop for plausability (less than a max number).<br><br>2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match. | • Polaris is initialized<br>• No other ASIC faults detected | 25 msec | Type A MIL Illumination. |
| SYS_ASIC_WSS_EDGE_MISMATCH_LR | P0606 | This monitor checks if:<br>• Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault<br>• ASIC outputs shorted to neighboring pins<br>• Open trace on circuit board | The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation. | 1) The micro monitors the number of edges received every loop for plausability (less than a max number).<br><br>2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match. | • Polaris is initialized<br>• No other ASIC faults detected | 25 msec | Type A MIL Illumination. |
| SYS_ASIC_WSS_EDGE_MISMATCH_RR | P0606 | This monitor checks if:<br>• Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault<br>• ASIC outputs shorted to neighboring pins<br>• Open trace on circuit board | The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation. | 1) The micro monitors the number of edges received every loop for plausability (less than a max number).<br><br>2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match. | • Polaris is initialized<br>• No other ASIC faults detected | 25 msec | Type A MIL Illumination. |
| MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_LEFT | C0504 | This monitor checks if:<br>• Defective system ASIC<br>• Defective wheel speed sensor | This fault is latched when the edge counts exceeds the threshold. | Excessive Edge counts > 55 | • Wheel speed sensor supply is enabled | 25 msec | Type A MIL Illumination. |
| MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_RIGHT | C050A | This monitor checks if:<br>• Defective system ASIC<br>• Defective wheel speed sensor | This fault is latched when the edge counts exceeds the threshold. | Excessive Edge counts > 55 | • Wheel speed sensor supply is enabled | 25 msec | Type A MIL Illumination. |
| MCU_WSS_EXCESSIVE_EDGES_DETECTED_REAR_LEFT | C0510 | This monitor checks if:<br>• Defective system ASIC<br>• Defective wheel speed sensor | This fault is latched when the edge counts exceeds the threshold. | Excessive Edge counts > 55 | • Wheel speed sensor supply is enabled | 25 msec | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MCU WSS EXCESSIVE EDGES DETECTED REAR RIGHT | C0516 | This monitor checks if:<br>• Defective system ASIC<br>• Defective wheel speed sensor | This fault is latched when the edge counts exceeds the threshold. | Excessive Edge counts > 55 | • Wheel speed sensor supply is enabled | 25 msec | Type A. MIL Illumination. |
| WSS_TYPE_MISMATCH_FRONT_LEFT | C0555 | This monitor checks if:<br>• Incorrect WSS installed (Non-Directional or Infineon sensor) | • Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed | Algorithm has detected that a directional WSS has incorrectly been installed | • WSS must be valid (supply enabled and no electrical problems) | Goal = 1 count<br>Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor | Type A. MIL Illumination. |
| WSS_TYPE_MISMATCH_FRONT_RIGHT | C0556 | This monitor checks if:<br>• Incorrect WSS installed (Non-Directional or Infineon sensor) | • Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonintelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still Duisestake 737 ms and for each ouse | Algorithm has detected that a directional WSS has incorrectly been installed | • WSS must be valid (supply enabled and no electrical problems) | Goal = 1 count<br>Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected. | Type A. MIL Illumination. |
| WSSTYPEMISMATCHREARLEFT | C0557 | This monitor checks if:<br>• Incorrect WSS installed (Non-Directional or Infineon sensor) | • Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonintelligent but have 3 level WSS | Algorithm has detected that a directional WSS has incorrectly been installed | • WSS must be valid (supply enabled and no electrical problems) | Goal = 1 count<br>Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected. | Type A. MIL Illumination. |
| WSST YPE_MISMATCH_REAR_RIGHT | C0558 | This monitor checks if:<br>• Incorrect WSS installed (Non-Directional or Infineon sensor) | • Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonintelligent but have 3 level WSS | Algorithm has detected that a directional WSS has incorrectly been installed | • WSS must be valid (supply enabled and no electrical problems) | Goal = 1 count<br>Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected. | Type A. MIL Illumination. |
| SYS_ASIC_U_WS_OVER_VOLT | C05A3 | This monitor checks if:<br>• Defective system ASIC | If VU_WS exceeds the rising U_WS over-voltage detection threshold for the detection debounce time, the ASIC sets the U_WS Overvoltage Warning SPI flag and disable the four high-side switches. | The MCU shall configure the wheelspeed sensor overvoltage bypass configuration to LOW.<br><br>If the WSS overvoltage warning bit is set, fault is set. | • Polaris is initialized | 50 msec | Type A. MIL Illumination. |
| SYS_ASIC_WSS_SUPPLY_LOW | P0562 | This monitor checks if:<br>• Defective system ASIC | • Within the ASIC, the U_WS and U12 voltages shall be internally divided down and shall feed dedicated ADC channels. | The MCU shall read the ASIC's U_WS Voltage Result SPI field and verify that "sufficient voltage" is present for wheelspeed operation.<br><br>For ECUs with no U_WS voltage regulation: the MCU shall also read the ASIC's U12 Voltage Result SPI field and perform a plausibility check between U_WS and U12. | • Polaris is initialized | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| WSS_OVER_TEMP_W ARNING | P0606 | This monitor checks if:<br>• Defective system ASIC<br>• Internal overheating | • MCU shall monitor the U_WS OverTemp Warning SPI flag received from the ASIC | MCU detects that the U_WS OverTemp Warning SPI flag received from the ASIC is TRUE | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_W SS HS STUCK_ON | C05A3 | This monitor checks if:<br>• Defective system ASIC | • The ASIC's open circuit detection (SM42) shall remain operational even if the channel's high-side supply is turned off or disabled.<br>• Periodically (e.g. once per ignition cycle), the MCU shall enable the low-side wheelspeed | Anyone wheel fails to detect an open-circuit during either the high-side or low-side supply ON check. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| MISMATCH_TIRE | C10EE | This monitor checks if:<br>• Significantly different size tires installed on the vehicle.<br>• Missing target ring (sensor picking up lug nuts)<br>• Anything that generates consistent differences in apparent wheel rotational speed.<br>• Different number of teeth on the exciter rings. | • Wheel Velocity Differences between one and the others > 15 %.<br>• The mismatch tire ratio adjustment is disabled if:<br>• Vehicle Velocity < 8.9 mph,<br>• Cornering is detected,<br>• Spinning wheels are detected,<br>• Braking is detected,<br>• Wheel speed sensor faults exist.<br>• Counter: Count 1-up<br>• Monitor Rate- 10ms | Wheel Velocity difference between one and the others > 15 % | • The mismatch tire ratio adjustment is disabled if:<br>• Vehicle Velocity < 8.9 mph,<br>• Cornering is detected,<br>• Spinning wheels are detected,<br>• Braking is detected,<br>• Wheel speed sensor faults exist,<br>• Emissions Rolls Test is active | 1 Count | Type B. MIL Illumination. |
| WSS_DIRECTION_FAILURE_FRONT_LEFT | C2A01 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Electro-magnetic interference (EMI). | • Number of valid directional and non-directional WSS sensors must be greater than 0.<br>• Number of valid directional WSS sensors must be greater thanO.<br>•Valid directional and non-directional WSS sensors must:<br>• Show unfiltered wheel-speed velocity > =15 km/h.<br>• Show unfiltered wheel-speed acceleration < 50 m/s .<br>•All valid directional and non-directional WSS sensors must show velocities within 15% of | At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards<br>For duration > 5 seconds<br>While vehicle speed > 15 km/h. | • WSS must be valid (supply enabled and no electrical problems) | 5 seconds | Type B. MIL Illumination. |
| WSS_DIRECTION_FAILURE FRONT_RIGHT | C2A02 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Electro-magnetic interference (EMI). | • Number of valid directional and non-directional WSS sensors must be greater than 0.<br>• Number of valid directional WSS sensors must be greater thanO.<br>•Valid directional and non-directional WSS sensors must:<br>• Show unfiltered wheel-speed velocity > =15 km/h.<br>• Show unfiltered wheel-speed acceleration < 50 m/s .<br>•All valid directional and non-directional WSS sensors must show velocities within 15% of | At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards<br>For duration > 5 seconds<br>While vehicle speed > 15 km/h. | • WSS must be valid (supply enabled and no electrical problems) | 5 seconds | Type B. MIL Illumination. |
| WSS_DIRECTION_FAILURE_REAR_LEFT | C2A03 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Electro-magnetic interference (EMI). | • Number of valid directional and non-directional WSS sensors must be greater than 0.<br>• Number of valid directional WSS sensors must be greater thanO.<br>•Valid directional and non-directional WSS sensors must:<br>• Show unfiltered wheel-speed velocity > =15 km/h.<br>• Show unfiltered wheel-speed acceleration < 50 m/s .<br>•All valid directional and non-directional WSS sensors must show velocities within 15% of | At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards<br>For duration > 5 seconds<br>While vehicle speed > 15 km/h. | • WSS must be valid (supply enabled and no electrical problems) | 5 seconds | Type B. MIL Illumination. |
| WSS_DIRECTION_FAILURE_REAR_RIGHT | C2A04 | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>• Electro-magnetic interference (EMI). | • Number of valid directional and non-directional WSS sensors must be greater than 0.<br>• Number of valid directional WSS sensors must be greater thanO.<br>•Valid directional and non-directional WSS sensors must:<br>• Show unfiltered wheel-speed velocity > =15 km/h.<br>• Show unfiltered wheel-speed acceleration < 50 m/s .<br>•All valid directional and non-directional WSS sensors must show velocities within 15% of | At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards<br>For duration > 5 seconds<br>While vehicle speed > 15 km/h. | • WSS must be valid (supply enabled and no electrical problems) | 5 seconds | Type B. MIL Illumination. |
| WSS_DIRECTION_FAILURE_UNKNOWN | C003F | This monitor checks if:<br>• Wheel speed sensor not mounted correctly.<br>Electro-magnetic interference (EMI). | • Number of valid directional and non-directional WSS sensors must be greater than 0.<br>• Number of valid directional WSS sensors must be greater thanO.<br>•Valid directional and non-directional WSS sensors must:<br>• Show unfiltered wheel-speed velocity > =15 km/h.<br>• Show unfiltered wheel-speed acceleration < 50 m/s .<br>•All valid directional and non-directional WSS sensors must show velocities within 15% of | When an equal number of sensors report opposite directions, this DTC is latched and all DWSS sensors are marked Failed.<br>num_dwss_forward_dir == num_dwss_reverse_dir | • WSS must be valid (supply enabled and no electrical problems) | 5 seconds | Type B. MIL Illumination. |
| SOL_OPEN_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_ISO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On and not faulted<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SOL OPEN ISO REAR LEFT | C0018 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>max value = 2.625 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL OPEN ISO REAR RIGHT | C001C | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>max value = 2.625 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL OPEN DUMP FRONT LEFT | C0011 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>[illegible] | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL OPEN DUMP FRONT RIGHT | C0015 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>i~rtA/u/hantha cr-Jonr-iirlic nnt anarnivorl | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>movVohiq —9 *RORV* | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_DUMP_REAR_LEFT | C0019 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>i~rtA/>Aihantho cr-Jonr-iirlic nnt anarnivarl | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>movVohiq —9 *RORV* | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_DUMP_REAR_RIGHT | C001D | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>• Anything that keeps solenoid feedback voltage<br>i~rtA/>Aihantho cr-Jonr-iirlic nnt anaraivarl | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>movx/ahiq —9 *RORV* | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_3W AY_PRIMARY | C0001 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI hit | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_3W AY_SECONDARY | C0003 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI [illegible] | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On | 30 ms | Type A. MIL Illumination. |
| SOL-FDBK_UNEQUAL_TO_CMD_3W AY_PRIMARY | C0001 | This monitor checks if:<br>• Deviation in PWM output status<br>• Defective microprocessor.<br>[illegible] | Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open cnlonnirl foillf ic inrlir-otorl | For too short on time = Ontime - 7.5% period<br>For too long on time = Ontime + 7.5% period | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On | 60 ms | Type A. MIL Illumination. |
| SOL_FDBK_UNEQUAL_TO_CMD_3W AY_SECONDARY | C0003 | This monitor checks if:<br>• Deviation in PWM output status<br>• Defective microprocessor.<br>[illegible] | Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open crJo i/dfoiili io ir>rliooio/d | For too short on time = Ontime - 7.5% period<br>For too long on time = Ontime + 7.5% period | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On | 60 ms | Type A. MIL Illumination. |
| SOL_OPEN_NORMAL_CLOSE_DAP | C0004 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>Anything that keeps solenoid feedback voltage low<br>[illegible] | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>[illegible] | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_PEDAL_SIM_ISO | C0024 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>Anything that keeps solenoid feedback voltage low when the solenoid is not eneraized. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>max value = 2.625 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>min value = 2.375 V<br>max value = 2.625 V | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| SOL_OPEN_SIM_TEST | C05D5 | This monitor checks if:<br>• Defective solenoid.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Leaky FET<br>Anx/thinn that lcaanc cnlannirl foorlhar'k x/nltono lnxA/ | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain rnmnarafnr foorlhor'k rlnhnunno time | After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit.<br><br>Drain comparator threshold:<br>[illegible] | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |
| DRIVERSHORT-ISOFRONT-RIGHT | C0014 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 30 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| DRIVER SHORT ISO REAR LEFT | C0018 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVERSHORTJ SOREARR IGHT | C001C | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVERSHORTDUMPFRONTLEFT | C001I | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER SHORT DUMP FRONT RIGHT | C0015 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_DUMP_REAR_LEFT | C0019 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_DUMP_REAR_RIGHT | C001D | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>• Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVERS HORT3 WAY_PRIMARY | C0001 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVERS HORT3 WAY_SECONDARY | C0003 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_NORMAL_CLOSE_DAP | C0004 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_PEDAL_SIMJSO | C0024 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVER_SHORT_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| DRIVE R_SHORT_SIM_TEST | C05D5 | This monitor checks if:<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>Anything that keeps solenoid feedback voltage low when the solenoid is not energized. | • Shorted Solenoid Driver<br><br>Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground. | Solenoid_feedback ?43% | 1. Solenoid is commanded off for 20 msec<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 30 ms | Type A. MIL Illumination. |
| SOL_SHORTJSO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• max value = 2.625 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 15 ms | Type A. MIL Illumination. |
| SOL_SHORTJ SO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• max value = 2.625 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 15 ms | Type A. MIL Illumination. |
| SOL_SH0 RTJSO_REAR_LEFT | C0018 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGHJSYSTEM_VOLTAGE) | 15 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SOL SHORT ISO REAR RIGHT | C001C | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• A »-»\4-k» iKt/'i lf>/-r\n o 1z-lr Hi/-J 4 A /■»/-'! /-»Mz \//~\V- | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the<br>rtrnin Z-»r r A/-»/-»!'/rlnkm inhz-\4-irvtz\ | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>- wolllZ>—OCOK\Z | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOLSHORTDUMPFRONTLEFT | C0011 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL SHORT DUMP FRONT RIGHT | C0015 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOLSHORTDUMPREARLEFT | C0019 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL SHORT DUMP REAR RIGHT | C001D | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>• The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_SHORT_3WAY_PRIMARY | C0001 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_SHORT_3WAY_SECONDARY | C0003 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor. | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_SHORT_NORMAL_CLOSE_DAP | C0004 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• max value = 2.625 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_SHORT_PEDAL_SIM_ISO | C0024 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anvthinn that kppn? <;nlpnnirl fpprlhar.k vnltanp | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain r.nmnaratnr fppHhar.k dphniinr.p timp | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• mav vahip = 9 R95 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_SHORT_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anvthino that keens solenoid feedback voltaoe | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comoaratr feedback debounce time. | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• max value = 2.625 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL SHORT SIM_TEST | C05D5 | This monitor checks if:<br>• Solenoid coils shorted internally.<br>• Solenoid shorted to a voltage supply or ground.<br>• Defective solenoid driver FET.<br>• Defective printed circuit board.<br>• Defective microprocessor.<br>• Anything that keeps solenoid feedback voltage low | • The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by<br>monitoring the drain voltage while the driver is commanded on.<br><br>The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time. | The MCU can make the distinction between open driverand shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off.<br><br>Drain comparator threshold:<br>• min value = 2.375 V<br>• max value = 2.625 V | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 15 ms | Type A. MIL Illumination. |
| SOL_OVERTEMP_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_ISO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_ISO_REAR_LEFT | C0018 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE} | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_ISO_REAR_RIGHT | C001C | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE HIGH SYSTEM VOLTAGE} | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_DUMP_FRONT_LEFT | C0011 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE HIGH SYSTEM VOLTAGE} | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_DUMP_FRONT_RIGHT | C0015 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br><br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br><br>2. Power Switch is On<br><br>3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE HIGH SYSTEM VOLTAGE} | 1 s | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SOL OVERTEMP DUMP REAR LEFT | C0019 | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE HIGH SYSTEM VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL OVERTEMP DUMP REAR RIGHT | C001D | This monitor checks if:<br>• Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE HIGH SYSTEM VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL OVERTEMP 3WAY PRIMARY | C0001 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL OVERTEMP 3WAY SECONDARY | C0003 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Vmltanp < 1« v zpxr.p.q.qivp hipfi system voi tagr | 1 s | Type A. MIL Illumination. |
| SOL OVERTEMP NORMAL CLOSE DAP | C0004 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_PEDAL_SIM_ISO | C0024 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL_OVERTEMP_SIM_TEST | C05D5 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Solenoid Over Temperature<br>• At power up the solenoids are setto the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle. | Solenoid_Temperature > 265 °C | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 1 s | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>? ZFYr.RSSIVF \| AW SYSTEM VOI TARE1 7 SV <rSimnlv | 5 msec | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_ISO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>? ZFYr.ESSIVE \| AW SYSTEM VOI TAHE\ 7 KV <rSi inslv | 5 msec | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_ISO_REAR_LEFT | C0018 | This monitor checks if:<br>• Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>? zpygessive i nw system voi tahe\7 Siinniv | 5 msec | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_ISO_REAR_RIGHT | C001C | This monitor checks if:<br>• Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>q TRYrR.Q.QI\R i nW SYSTEM VAI TACH 7 SU<-Qimnlv | 5 msec | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_PEDAL_SIM_ISO | C0024 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>q TRYrR.Q.QI\R i nW SYSTEM VAI TACH 7 SU<-Qimnlv | 5 msec | Type A. MIL Illumination. |
| SOL_DRIVER_OVERTEMP_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>Anything that causes the solenoid to be active for excessive (usually unintended) period of time | • Driver Overtemp info transmitted via SPI from Polaris ASIC | Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature.<br>Microprocessor recieves the information via SPI from the ASIC | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. (EXCESSIVE_LOW_SYSTEM_VOLTAGE) 7.5 V < Supply Voltage < 18 V (EXCESSIVE_HIGH_SYSTEM_VOLTAGE) | 5 msec | Type A. MIL Illumination. |
| CLAMP_ACTIVATION_FAILURE_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. Battery voltage is within operating range. | 45 counts | Type A. MIL Illumination. |
| CLAMP-ACTI VATION_FAILUREJ SO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. Battery voltage is within operating range. | 45 counts | Type A. MIL Illumination. |
| CLAMP_ACTIVATION_FAILURE_ISO_REAR_LEFT | C0018 | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. Battery voltage is within operating range. | 45 counts | Type A. MIL Illumination. |
| CLAMP_ACTIVATION_FAILURE_ISO_REAR_RIGHT | C001C | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Solenoid is commanded On<br>2. Power Switch is On<br>3. Battery voltage is within operating range. | 45 counts | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| CLAMP ACTIVATION FAILURE NORMAL OPEN DAP | C0002 | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br><br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Coil Overcurrent DTC is not set<br>2. No CLAMP_ACTIVATION_FAILURE DTC is set<br>3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance | 45 counts<br>(minimum 3 failures in 10 attempts) | Type A. MIL Illumination. |
| CLAMP ACTIVATION FAILURE PEDAL SIM ISO | C0024 | This monitor checks if:<br>• Defective / Missing Flyback Diode<br>• Defective printed circuit board<br>• Defective Polaris ASIC | Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off.<br><br>Microprocessor receives the information via SPI from the ASIC | Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured. | 1. Coil Overcurrent DTC is not set<br>2. No CLAMP_ACTIVATION_FAILURE DTC is set<br>3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance | 45 counts<br>(minimum 3 failures in 10 attempts) | Type A. MIL Illumination. |
| LEAKYDRIVERUNKNOWNABSCIRCUITS | C0024 | This monitor checks if:<br>• Defective FET<br>• Defective printed circuit board | • Slip Control Power Switch must be commanded ON than subseguently commanded OFF | If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set. | • Power Switch is ON, then OFF<br>• will only be retested after a power cycle | 8 Count | Type A. MIL Illumination. |
| LEAKY_DRIVERUNKNOWN_BOOST_CIRCUITS | C0024 | This monitor checks if:<br>• Defective FET<br>• Defective printed circuit board | • Slip Control Power Switch must be commanded ON than subseguently commanded OFF | If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set. | • Power Switch is ON, then OFF<br>• will only be retested after a power cycle | 8 Count | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled-SHUTDOWN-FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Prnhlpm rparlinci Rnninp OPR timp itspci tn | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller r.npffir.ipnts and thp r.iirrpnt fppdhar.k prrnr | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_ISO_FRONT_RIGHT | C0014 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled SHUTDOWN FAILURE (loss of hatfonzX QDIfaillira NUDAM faillira ataX | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to cnfiirafa hiah ar la\AZ Tha fima fa raaah cafiirafian rlananrlc iinan fha fl in inn af fha aanfrallar | Duty cycle is out of range | Polaris is initialized | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem reading Engine OFF time, used to<br>[illegible] | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error. | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_ISO_FRONT_LEFT | C0010 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled SHUTDOWN FAILURE (loss of Kaffarx/X QDIfaillira NIX/PAMfaillira ataX | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to cafiirafa hiah ar la\AZ Tha fima fa raaah cafiirafian rlananrlc iman fha fl ininn af fha aanfrallar | Duty cycle is out of range | Polaris is initialized | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_ISO_REAR_RIGHT | C001C | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem readina Enaine OFF time, used to | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error. | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_ISO_REAR_RIGHT | C001C | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of hntfnn/) QDI foihiro M\/DAft4 foihiro etc) | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to cnfiirnfn KinK Mr V-Wai Thn +imn frx ranch o oil iro +il-Arx dnnnnrlo iman tha timina of tha aantrallar | Duty cycle is out of range | Polaris is initialized | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_ISO_REAR_LEFT | C0018 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem reading Engine OFF time, used to | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error. | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_ISO_REAR_LEFT | C0018 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled SHUTDOWN FAILURE (loss of Kaffarx/X QDIfaillira NIX/PAMfaillira ataX | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to cafiirafa hiah ar laxAZ Tha fima fa raaah cafiirafian rlananrlc iman fha fl ininn af fha aantrallar | Duty cycle is out of range | Polaris is initialized | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem reading Engine OFF time, used to | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error. | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_NORMAL_OPEN_DAP | C0002 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled SHUTDOWN FAILURE (loss of KatfarVX QDIfaillira NIX/PAMfaillira ataX | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to cafiirafa hiah ar laxAZ Tha fima fa raaah cafiirafian Hananrlc iman fha fimina nf fha aantrallar | Duty cycle is out of range | Polaris is initialized | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_HIGH_PEDAL_SIMJS O | C0024 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem readina Enaine OFF time, used to | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error. | Duty cycle is out of range | • Polaris is initialized.<br>• Command is less than 720 mA.<br>• Self-test complete.<br>• Excessive Low Voltage fault not maturing | 100 ms | Type A. MIL Illumination. |
| SOL_CC_DC_SATURATED_LOW_PEDAL_SIM_ISO | C0024 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of hntfnrxz) QDIfoihiro MVDAK/l«fnihiro t \ | If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to onfiirnfo KiriK rxr lr\\A/ Thn timn frx ranrh ent iimfinn rlorxorxHo iirxrxrx thn fiminci rxf thn r»r>rxirrv 11or | Duty cycle is out of range | Polaris is initialized | 100ms | Type A. MIL Illumination. |
| SOL_OVER_VOLTAGE_NORMAL_CLOSE_DAP | C0004 | This monitor checks if:<br>Defective/Missing Suppression diode<br>Defective PCB | If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag.<br>MHIP. Thoro nrn nr» oiinrxmccirxn rlior4oo rxn nnx/ rvf thn F iirrxrx r»r>ilo Koooiioo fhoV nro rxoi | Duty cycle is out of range | Polaris is initialized | 100ms | Type A. MIL Illumination. |
| SOL_OVER_VOLTAGE_SIM_TEST | C05D5 | This monitor checks if:<br>Defective/Missing Suppression diode<br>Defective PCB | If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag.<br>MH 11—• Thara ara na ci innraccian zHiazHac an am/ af fha IT iimn aailc haaai ica thaw ara naf | Duty cycle is out of range | Polaris is initialized | 15ms | Type A. MIL Illumination. |
| DC_SOL_REGULATION_FAILURE | P0606 | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall monitor the state of each DROx output and report if it does not match the commanded state. | The MCU shall monitor ASIC's "DROx Gate Monitor Fault" SPI bits. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SOL_DUTY_CYCLE_FDBK_PLAUS_FAULT | P0606 | This monitor checks if:<br>• Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc)<br>• Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, | The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance.<br><br>Current threshold is 20% | The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance.<br>Current threshold is 10% | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| COIL_CURRENT_FDBK_PLAUS_FAULT | P0606 | This monitor checks if:<br>• Defective system ASIC<br><br>ASIC cannot control sol current properly | For CC_DRx channels in duty-cycle control mode:<br><br>While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. | For CC_DRx channels in duty-cycle control mode:<br><br>While aCC_DRxcoil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. | • Polaris is initialized<br>• Coil Commanded in Duty Cycle mode | 50 msec | Type A. MIL Illumination. |
| SPI_FAILURE_ASIC | P0606 | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective Polaris ASIC.<br>a Flofo/M ¨i\/r mirr/ nrrxr'noorxr | • This fault can be set by problems communicating over SPI between the MICRO and the Polaris ASIC. It is checked ONCE at power up.<br>• The SPI initialization will fail if the driver has not finished a previous transmission when a<br>rxz2>\A/ trnncmio oi/rn io roniiirorl ( vyrxi nnmi/rh QDI th rm i/rhm it\ | Polaris Error Flag= TRUE Polaris.Error_Flags != 0<br>Polaris.Error_Flags_Observed \|= Polaris.Error_Flags | • Power Switch is ON | 3 ms | Type A. MIL Illumination. |
| NVRAM-DEVICEJNOPERATIVE | P062F | This monitor checks if:<br>• Problem in chip select line<br>• fault in SPI driver related code/circuit. | • This fault is set<br>1. When SPI driver is unable to do message transfer<br>2. If unable to write or time out before write operation could complete.<br>Q If ram lacfarl maccaaa francfar naf in fima Zinah izHina lAzait timaX | device operational flag = FALSE<br>(error during read write request occured) | • Power Switch is ON | 5ms | Type A. MIL Illumination. |
| NVRAM_WRITE_FAILURE | P062F | This monitor checks if:<br>• Communication problem with NVRAM chip<br>• NVRAM hardware problem<br>• DC*Rnrahlam | • This fault is detected by the NVRAM handler. The NVRAM handler verifies a successful write event by reading back the information that is expected to be stored in NVRAM and also verifying the checksum. | If the NVRAM handler detects an unsuccessful write event three times, the fault is set. | • Power Switch in ON | 170 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| COIL DRIVER SPI FAILURE | P0606 | This monitor checks if:<br>• Defective system ASIC | • After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected). | The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin.<br>The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit.<br>After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected). | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| EXTWATCHDOGFAIL | P0606 | This monitor checks if:<br>• Defective system ASIC | • None. | Periodically (e.g. once per ignition cycle), the MCU shall perform the following watchdog test (or equivalent):<br><br>(1) Start with the Watchdog Counter Value SPI field = 0, the WDEN pin high, and all other "watchdog-enabled functions" otherwise enabled.<br>(2) Verify Watchdog Status SPI bit is 0 and all "watchdog-enabled functions" are disabled.<br>(3) Service watchdog until the Watchdog Counter Value = 6. Verify the conditions from (2) remain.<br>(4) Set the WDEN pin low, then service the watchdog.<br>(5) Confirm the Watchdog Counter Value = 7 and all "watchdog-enabled functions" are disabled.<br>(6) Allowthe watchdog to timeout, then set the WDEN pin high.<br>(7) Confirm the Watchdog Counter Value = 0, Watchdog Status bit is 0, and all "watchdog-enabled functions" are disabled.<br><br>Watchdog-enable functions are:<br>(1) solid state relay driver pin (VDG),<br>(2) the motor L bridge pre-driver pins (PDG and PRG),<br>(3) the ENQ digital output pin, and<br>(4) the low-side coil drivers (CC_DRx) and pre-drivers (DROx). | • Polaris is initialized | 10 msec | Type A. MIL Illumination. |
| AD_PERIPHERAL_TIMEOUT_FAILURE | P060B | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective Polaris ASIC. | •A/D Peripheral Timeout Failure<br><br>• When reading an A/D channel, the software enters a "wait" loop where it looks for a bit in | Adc Port Lockup Detected = TRUE | • Power Switch is ON | 5ms | Type A. MIL Illumination. |
| AD_EVENT_LOCKUP | P060B | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective Polaris ASIC. | A/D Event Lockup Failure<br><br>Two detection methods: | Adc Lockup Count = 0 or<br>Adc Synchronization Failed = TRUE | • Power Switch is ON | 5ms | Type A. MIL Illumination. |
| SOLENOID_TIMEOUT_FAILURE | P0606 | This monitor checks if:<br>• Defective microprocessor.<br>• Incorrect microprocessor application code. | Each solenoid in the system is expected to generate ON test pulses to indicate the end of a solenoid pulse duration. At the completion of the System Self-Test, the number of ON test pulses issued during initial test and compare them with the number of ON tests performed | Solenoid[solenoid_id].Sol_On_Test_Cnt !=<br>Solenoid[solenoid_id].Expected_Sol_Test_Cnt | • Mode manager is normal mode<br>• Power switch is not faulted<br>• System is not initializing<br>• QVcfamia nnt raj nitiali-yinn | 5ms | Type A. MIL Illumination. |
| SOLENOID-PERIODICJNTERRUPT-FAILURE | P0606 | This monitor checks if:<br>• Defective microprocessor. Incorrect microprocessor application code, ex. Bad scheduler | HET Periodic Interrupt Failure | periodic het interrupt flag = FALSE<br><br>(periodic interrupt did not occur) | Power Switch is ON | 5ms | Type A. MIL Illumination. |
| SYS_ASIC_U3_SELECT_FAILURE | P0606 | This monitor checks if:<br>Defective system ASIC<br>Missing external U3 FET when external U3 FETis | If the external U3 FET is present, the ASIC shall set the U3 External FET SPI bit, if not present it will clear the bit. Software sets fault if bit is opposite of what is expected. | The MCU shall read the ASIC's U3 External FET status bit and compares against the expected value. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_WDEN_STATUS_CORR | P0606 | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall provide the WDEN Status SPI bit which reflects the filtered state of the WDEN pin. The MCU shall monitorthe ASIC's WDEN Status SPI flag and verify it is the expected value. | WDEN Status SPI flag <> WDEN PIN status | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC-EXCESS_STARTUP | P0606 | This monitor checks if:<br>• Defective system ASIC | • During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. | The MCU shall monitor the ASIC's Excessive Startup Time SPI flag. | • Polaris is initialized | 5 msec | Type A. MIL Illumination. |
| SYS_ASIC_EXCESS_STARTUP_AT_SPEED | P0606 | This monitor checks if:<br>• Defective system ASIC | • During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. | The MCU shall monitor the ASIC's Excessive Startup Time SPI flag. | • Polaris is initialized | 5 msec | Type A. MIL Illumination. |
| SYS_ASIC_ADC_REF_HIGH | P060B | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), andVmid (ADREFHI/2). | Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlowand Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds.<br><br>Note: This MCU requirement is the same as in SM137. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_ADC_REF_MID | P060B | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), andVmid (ADREFHI/2). | Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlowand Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds.<br><br>Note: This MCU requirement is the same as in SM137. | • Polaris is initialized | 25 msec | Type A. MIL Illumination. |
| SYS_ASIC_ADC_REF_LOW | P060B | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), andVmid (ADREFHI/2). | Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlowand Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds.<br><br>Note: This MCU requirement is the same as in SM137. | • Polaris is initialized | 50 msec<br>10 Counts | Type A. MIL Illumination. |
| SYS_ASIC-AD C_ATTN_BIT_STUCK | P060B | This monitor checks if:<br>• Defective system ASIC | The MCU once per power cycle commands each ASIC external ADC channel with the attenuation mode opposite of normal operation and verify that its attenuation enable feedback SPI bit is not stuck. Commanded 10 times and if 3 in a row are failed the fault is set | Anyone of the 10 ASIC external ADC channel's attenuation enable feedback SPI bits is stuck | • Polaris is initialized | Time 3 ms = Goal 3 counts | Type A. MIL Illumination. |
| SYS_ASIC_ADC_ATTN_FACTOR | P060B | This monitor checks if:<br>• Defective system ASIC | • Each background conversion loop, the ASIC shall perform the conversion of the internal Vmid voltage both with and without the selectable attenuation switched in. The conversion results shall be stored respectively in the separate ADC Vmid with Attenuation Test Result | Calculated ADC attenuation factor < 0.6176<br>OR<br>Calculated ADC attenuation factor > 0.6320 | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_EXT_ADC_FAILURE | P060B | This monitor checks if:<br>• Defective Polaris ASIC. | The ASIC reports the state of the attenuation (selected or not selected) for each external ADC channel via the "ADx Attenuation Feedback" SPI bits within the ADC result registers. For fault detection purposes, the feedback bits directly monitorthe control signal state within | Compare the ASIC external ADC channel read of SPI and the ADx Attenuation feedback bit against expected attenuation setting | • Polaris is initialized | 15ms | Type A. MIL Illumination. |
| SYS_ASIC_SYNC_PULSE_DETECT | P0606 | This monitor checks if:<br>• Defective system ASIC | • ASIC provides SYNC ARMED SPI mapped bit that can be set and cleared through SPI, or cleared by detected valid SYNC rising edge event. | Periodically (e.g. once per ignition cycle) the MCU shall send a rising edge on the SYNC pin, while the SYNC Armed SPI bit is low. The MCU shall verify that the Unarmed SYNC Edge Detected SPI flag is set. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_SPI_DETECT | P0606 | This monitor checks if:<br>• Defective system ASIC | • None. | Periodically, and within the fault response time, the MCU shall send separate SPI frames with:<br>(1) an incorrect CRC<br>(2) an incorrect number of SPI bits<br>(3) an invalid command (invalid address)<br>(4) invalid data | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SYS ASIC REGISTER | P0606 | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall provide the Storage SPI register. The register contents shall have no effect on the ASIC operation. Register contents shall only be modified by a SPI write and not by any internal ASIC action. | Every major software loop (e.g. 5 - 10ms), the MCU shall perform a write to, normal mode read from and dump mode read from the Storage SPI register. Each loop, the value written shall change, and shall include checkerboard (QxAA,0x55), walking 1s and walking Os). The MCU shall verify the written and read values match.<br><br>After performing a write to a safety critical SPI register, the MCU shall perform a read back of the same register, and verify that the contents were written. The read shall occur within the same software loop, in order to allowthe MCU to correct any mis-write within the fault response time.<br><br>Note: The read back refers to a separate read request, and is not the same as verifying the write echo. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYSASICDUPLSEED | P0606 | This monitor checks if:<br>• Defective system ASIC | • None. | The MCU shall detect if ASIC provides the same seed value 3 times in a row. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_AD_REFRESH_FAILURE | P060B | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read. | Each time an ASIC ADC channel is read over SPI, the MCU shall also read the Data Read bit. If the Data Read bit is not set, the MCU treats the result as old data. If the Data Read bit is not set and the time since the prior ADC read is longer than the ASIC ADCs background loop time, the MCU shall detect a fault<br><br>Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_AD_DATA_READ_STUCK | P060B | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read. | Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels.<br><br>Note: Because the ASIC could update the result register between two register reads (resulting in two high Data Read bits), 3 successive reads are required. | • Polaris is initialized | 1 msec | Type A. MIL Illumination. |
| SYS_ASIC_MISSING_SYNC_EDGE | P0606 | This monitor checks if:<br>• Defective system ASIC | • After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected). | The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin.<br>The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit.<br>After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected). | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| DC_SOL_ON_TIME_MON_FAILED | P0606 | This monitor checks if:<br>• Defective system ASIC<br><br>ASIC is not controlling PWM properly | The ASIC shall monitor the filtered DRDx feedback voltage and shall provide an on-time counter (for each channel) which shall accumulate the QDRx on-time. At each valid SYNC edge, the ASIC shall latch the current accumulated value into the DRDx On-Time Feedback Register and clear the on-time counter.<br><br>The MCU shall integrate the commanded on-time between valid SYNC pulses and verify it matches the ASIC's reported result. | Compare the solenoid commanded on time to the measured on time. If the difference in the two times is >250 microsec for 10 consecutive checks then the fault is immediately matured | • Polaris is initialized | 50 msec | Type A. MIL Illumination. |
| SYS_ASIC_UNEXPECTED_SYNC_PULSE | P0606 | This monitor checks if:<br>• Defective Polaris ASIC. | • The MCU shall monitor the ASIC's Unarmed SYNC Edge Detected SPI bit and verify no expected SYNC pin edges have occurs.<br><br>• After a ricinn QVMC nin arfna hoc i-ir-i-i irrarl /a n ot the ctort af the navt cnftuiora I>><a-l\| the | Fault will set if the MCU detects an unexpected sync pulse from the ASIC by monitoring the Unarmed SYNC Edge Detected SPI bit | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_SYNC_TIMEOUT | P0606 | This monitor checks if:<br>• Defective Polaris ASIC.<br>• Defective microprocessor.<br>• Hnarotinn cVcfam foillira | The ASIC detects if the time since the prior valid rising SYNC edge exceeds the SYNC timeout time. Then the ASIC turns offthe coil drivers and sets the "SYNC Timeout" SPI bit. The SW monitors the ASIC's "SYNC Timeout" SPI bit to detect if a SYNC Timeout has rv'r'i irrorl | This fault would be set if the SPI bit SYNC Timeout is set for 25msec | • Polaris is initialized | max 17ms | Type A. MIL Illumination. |
| SYS_ASIC_CONFIG_REG_FAILURE | P0606 | This monitor checks if:<br>• register error<br>• register rewrite error | • Configuration Registers: (These are written once at startup.) After writing once, read back and verify their contents during every subsequent 5ms SPI loop. | Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_CONTROL_REG_FAILURE | P0606 | This monitor checks if:<br>• register error<br>• register rewrite error | • Control Registers: (These are written every 5ms loop for control orfailsafing purposes.) For those registers not covered by othersMs, read and verify every 5ms loop, prior to performing the write. | Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| ENQ_PIN_FAILED | P0606 | This monitor checks if:<br>• Defective ASIC. | • The Polaris ASIC provides a digital push-pull output, ENQ. ENQ is high when the ENQ Enable SPI bit is set, the Watchdog Status is "in range", WDEN Status is high, and nRST Status is high. Otherwise ENQ is low. ENQ is used as a pre-driverto enable ECU circuitry. | The MCU shall continuously monitor the ASIC ENQ feedback signal state and verify that it has the expected state.<br>The HW shall provide a digital feedback signal of ASIC ENQ signal to MCU digital input. | • Polaris is initialized | 10 msec | Type A. MIL Illumination. |
| BROKEN_WIRE_TEMP_FDBK_A | P0606 | This monitor checks if:<br>• Improper (broken wire) connection between the external analog sensor and the input pin.<br>• Defective microprocessor. | • Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set. | • Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read.<br>• If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set. | • Power Switch is ON | 5 msec | Type A. MIL Illumination. |
| CANFD1_SPI_FAILURE | P0606 | This monitor checks if:<br>• Problem in chip select line<br>• fault in SPI driver related code/circuit.<br>• If QDI nnmmi inirnf inn ic nnt clirnaccfi 11 onrl if ia/io | • This fault is set<br>1. When SPI driver is unable to do message transfer<br>2. If unable to write or time out before write operation could complete.<br>Q If ram lactarl macco/ia tmnefar in time Zinnh irlinn IA/ait fimaf | device operational flag = FALSE<br>(error during read write request occured) | • Power Switch is ON | 1 count | Type A. MIL Illumination. |
| CANFD2_SPI_FAILURE | P0606 | This monitor checks if:<br>• Problem in chip select line<br>• fault in SPI driver related code/circuit.<br>a If QDI Wxnmi irx i/-»oi i/-xr» io r»/-xf oi imnccfi il orxrl if ia/o | • This fault is set<br>1. When SPI driver is unable to do message transfer<br>2. If unable to write or time out before write operation could complete.<br>Q If ron imotnrl mooonrio tmnefar rx/—if in time Zinnh irlinn XA/oif timo) | device operational flag = FALSE<br>(error during read write request occured) | • Power Switch is ON | 1 count | Type A. MIL Illumination. |
| NVM_REQ_FAILED | P062F | This monitor checks if:<br>• Eep Driver reports JobErrorNotification, indicating that the request failed, either after it was accepted r\r hoc'niion thn mr\rliilr»rofiioorl thn rariiiaot | If a user request is either rejected and the number of configured retries expired or if it was accepted and then failed, while being processed by the underlying memory stack module. | NvM_CurrentBlockInfo_t.LastResult_t != NVM_REQ_OK | Continuous failsafing | 1 count | Type A. MIL Illumination. |
| NVM_INTEGRITY_FAILED | P062F | This monitor checks if:<br>• If the read for a block detects that the data and/or CRC are corrupted based on the CRC check norfnrmorl nftnrthn ronrl I'/no finioKorl oi ir»r»ooof illw | If the processing of a read request will detect, via the CRC checking, corruption of the data and/or CRC of the block that was subject to the read operation. | NvM_CurrentBlockInfo_t.LastResult_t == NVM_REQ_INTEGRITY_FAILED | Continuous failsafing | 1 count | Type A. MIL Illumination. |
| NVM_LOSS_OF_REDUNDANCY | P062F | This monitor checks if:<br>If the contents are different, if the first instance becomes corrupted or if the first instance cannot be ranrl than Mx/TTI XA/ill rannrf fhic fdiilf | If the reading performed over a REDUNDANT block indicates the block has lost its redundancy. | one block is OK, other isn't -> block isn't redundantly stored within NV RAM. if(firstBlockDefect ^ secondBlockDefect) == TRUE | Continuous failsafing | 1 count | Type A. MIL Illumination. |
| NVM_QUEUE_OVERFLOW | P062F | This monitor checks if:<br>If the number of requests made to NvM exceeds the size of the queue and none of the ones in the queue finioKoo Kh/M XA/ill rxr>i Kn\/o nrxx/ mr'm cnora'A/hnm | If a request is made that cannot be stored in the NvM queue (be it standard or immediate) as all configured queue positions of the related queue are already containing user requests. | queue was full, request to queue the next block leads to queue overflow | Continuous failsafing | 1 count | Type A. MIL Illumination. |
| EEP-FAILURE | P062F | This monitor checks if:<br>SPI transmission is faulty | The failure is set in case of a failed sequence due to a failure of the SPI transmission. A sequence can also fail if a transfer was rejected because of full transmit buffer. | EEP_E_CANCEL_FAILED - DEM event if a job cancelation failed<br>EEP_E_READ_FAILED - DEM event if read job failed<br>EEP_E_COMPARE_FAILED - DEM event if compare job failed<br>EEP_E_TEST_COM_FAILED2 - DEM event if test communication job failed<br>EEP_E_WRITE_FAILED - DEM event if write job failed<br>EEP_E_ERASE_FAILED - DEM event if erase job failed | Continuous failsafing | 3 counts | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SYS ASIC U1 SELECT FAILURE | P0606 | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective ASIC.<br>• Defective microprocessor. | • The U1 operating mode and voltage level selections are viewable via the U1 Mode Select Status and U1 Voltage Select Status SPI fields. The SPI feedback signals are internally routed so that they monitor the true state of the mode and voltage control circuits. | The MCU verifies that the U1 Mode Select Status and U1 Voltage Select Status SPI fields in register 0x45 match the values which are hard-coded into SW corresponding the application's intended HW population.<br><br>If a mismatch is detected, fault is set. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYSASICNVMFAIL | P062F | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective ASIC.<br>• Defective microprocessor. | • During the ASIC's full active logic reset sequence (within the active mode), the ASIC shall read and compare the primary and inverted U1 mode and voltage SPI fields.<br><br>• If primary and inverted SPI fields do not match, the ASIC shall configure the U1 regulator in the 1.1V, supervisor mode configuration and shall set the TRW NVM Fail SPI bit in registers | The MCU shall periodically verify that the TRW NVM Fail SPI bit (reg 0x45) is low.<br><br>If the bit is read as high, fault is set. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYSASICSMDISABLED | P0606 | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective ASIC.<br>• Defective microprocessor. | • The ASIC shall set the Safety Mechanisms Disabled SPI bit when a test mode is active which prevents the ASIC from resetting the MCU or disabling power supplies in reaction to a fault. | The MCU shall periodically verify that the Safety Mechanisms Disabled SPI bit is low.<br><br>If the bit is read as high, fault is set. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS ASIC SPI TRANSFER ERROR | P0606 | This monitor checks if:<br>• SPI transfer error<br>• ASIC problem<br>• PCB problem | • The micro monitors the SPI data transmissions and checks for SPI transfer errors | If any of the below errors are observed in Spi Data transmission this fault will set.<br><br>POLARIS_SPI_NOT_INITIALIZED<br>POLARIS_SPI_TRANSFER_REJECTED<br>POLARIS_SPI_TX_MSG_LENGTH_ERROR | • Continuous failsafing | 15 msec | Type A. MIL Illumination. |
| ROM CRC FAILURE | P0606 | This monitor checks if:<br>• Defective microprocessor<br>• Incorrect fault detection algorithm | • CRC ROM Failure R4<br><br>• The ROM self-test is a dynamic test that is called from the scheduler at a rate of 5 msec.<br>Corh DOM cai-tinn ic rharLci immarl K\/t<z>K\/ hxzfo Corh xazill orlrlarl tn thn rnrrant | calculated CRC != stored CRC | • Power Switch is ON | 5 msec | Type A. MIL Illumination. |
| LMU_DATA_PATH_TEST_FAILURE | P0606 | This monitor checks if:<br>Permanent failure of the LMU (Local Memory Unit) SRAM data path | The fault will be set if the data written to the LMU SRAM does not match the data readback from the same location of the LMU SRAM | The test consists of the following sequence:<br>1. Write 8 different 8-bit values to sequential addresses in LMU SRAM. Data pattern: 0x1122334455667788<br>2. Perform a 64-bit read and compare against expected values<br>3. Write 4 different 16-bit values to sequential addresses in LMU SRAM. Data pattern: 0xEEDDCCBBAA998877<br>4. Perform a 64-bit read and compare against expected values<br>5. Write 2 different 32-bit values to sequential addresses in LMU SRAM. Data pattern: 0xA5A5A5A5A5A5A5A5<br>6. Perform a 64-bit read and compare against expected values | Always runs during initialization | 1 Count | Type A. MIL Illumination. |
| OS_TASK_MONITOR_FAULT_COREO | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Checks to be sure that all tasks onCPUOare running | None | Always Enabled | 1 count | Type A. MIL Illumination. |
| OS_TASK_MONITOR_FAULT_CORE1 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Checks to be sure that all tasks on CPU1 are running | None | Always Enabled | 1 count | Type A. MIL Illumination. |
| OS_TASK_MONITOR_FAULT_CORE2 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Checks to be sure that all tasks on CPU2 are running | None | Always Enabled | 1 count | Type A. MIL Illumination. |
| OSJ NTERNAL_FAILURE_COREO | P0606 | This monitor checks if:<br>Failure in a hardware system that the OS depends on. | The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on. | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| OS_INTERNAL_FAILURE_CORE1 | P0606 | This monitor checks if:<br>Failure in a hardware system that the OS depends on. | The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on. | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| OS_INTERNAL_FAILURE_CORE2 | P0606 | This monitor checks if:<br>Failure in a hardware system that the OS depends on. | The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on. | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| RTOS_FAILURE_COREO | P0606 | This monitor checks if:<br>Software Error | EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code. | None | Always Enabled | 5*Number of errors in 10ms update Cycle | Type A. MIL Illumination. |
| RTOS_FAILURE_CORE1 | P0606 | This monitor checks if:<br>Software Error | EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code. | None | Always Enabled | 5*Number of errors in 10ms update Cycle | Type A. MIL Illumination. |
| RTOS_FAILURECO RE2 | P0606 | This monitor checks if:<br>Software Error | EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code. | None | Always Enabled | 5*Number of errors in 10ms update Cycle | Type A. MIL Illumination. |
| UNEXPECTED-EXCEPTIONCOREO | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will<br>noil Dmtantinnl-Innlz XA/ith atotiia ni-irlo C DDHTCCTIAM CYC'CDTir'iM nrm/irlarl th<z> | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| UNEXPECTED_EXCEPTION_CORE1 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will<br>noil Drntontinnl-Innlz unth ctotnc nnrlo C HQ DDOTCCTIDM CYCCDTinM nrnwiidarl tho | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| UNEXPECTED_EXCEPTION_CORE2 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will<br>noil Drntantin nl-Inn lz \A/ith atotiia nnrlo C DPCiTCC'Tir'iM CYC'CDTir'iM r»m\/irlarl the | None | Always Enabled | 10 msec | Type A. MIL Illumination. |
| FSMC_MISMATCH_VELOCITY | P0606 | This monitor checks if:<br>• Defective Microprocessor<br>a Af Innof \A/hnol \/ol/>>/a»ifl/ 11ofi/-\n hotiA/nnn | • Mismatched Wheel Velocity Failure<br><br>• Both main timer and redundant timer are calculating the velocity for each wheel. All wheel<br>onanrlo l-*/«>rYtr\ iiforl h\/ fhn main timer nrn trnncmittorl fr> the mrliincInnt timer oUorW time | Tolerance of any wheel velocity calculations is > +/- 10 km/h | • High wheel acceleration inhibits this routine | 35 ms | Type A. MIL Illumination. |
| LOGICAL-SEQUENCEFAULT-COREO | P0606 | This monitor checks if:<br>Improper sequencing of runnables | If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 0 is set. | Fault is set if LSM flag in Core 0 is set. | Continuous Failsafing | 1 count | Type A. MIL Illumination. |
| LOGICAL_SEQUENCE_FAULT_CORE1 | P0606 | This monitor checks if:<br>Improper sequencing of runnables | If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 1 is set. | Fault is set if LSM flag in Core 1 is set. | Continuous Failsafing | 1 count | Type A. MIL Illumination. |
| LOGICAL_SEQUENCE_FAULT_CORE2 | P0606 | This monitor checks if:<br>Improper sequencing of runnables | If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 2 is set. | Fault is set if LSM flag in Core 2 is set. | Continuous Failsafing | 1 count | Type A. MIL Illumination. |
| CPU_FAILURE_SEVERITY_X | P0606 | This monitor checks if:<br>• Defective microprocessor<br>• Improper Application Code | The SW shall configure the MCU's fault manager to signal MCU faults via alarm but don't require the MCU to be held in reset. | See AuriX-AlarmS-Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_X fault. | • Power Switch in ON | Checked continuously set on first occurrence. | Type A. MIL Illumination. |
| CPU_FAILURE_SEVERITY_Y | P0606 | This monitor checks if:<br>• Defective microprocessor<br>• Improper Application Code | Activates the FSPthen checks to see if it truly got activated.<br>Also, checks to see if the ASIC sawthe FSP pin activate. | If Polaris feedback does not match FSP command<br>OR<br>If Aurix feedback does not match FSP command | • Power Switch in ON | Checked once at power up, sets for single occurrence of feedback not matching expectation | Type A. MIL Illumination. |
| CPU_FAILURE_SEVERITY_TRANSIENT | P0606 | This monitor checks if:<br>• Defective microprocessor<br>• Improper Application Code | The SW shall configure the MCU's fault manager to signal MCU faults via alarm and configures hardware intervention to hold MCU in reset. When the alarm occurs, SW stores information in NVRAM. On the next Ignition cycle if SW sees indication stored in NVRAM<br>fHoi inrl oo i*/o Korl o r» EQD iir i*/o ent thn foiilf Klrvfo* Thorn io nniimnfnn fHoi Q\A/ | See AuriX-AlarmS-Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_TRANSIENT fault. | • Power Switch in ON | Checked once at power up. | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SYS ASIC SYNC TIME MISMATCH FAULT | P0606 | This monitor checks if:<br>• Defective system ASIC | • At each valid SYNC edge, the ASIC shall store the time between that edge and the prior valid SYNC edge in the Prior SYNC Interval Time SPI register field. | The MCU shall measure time between SYNC edges (based upon the MCU clock) and verify the time matches the ASIC's Prior SYNC Interval Time SPI field. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_TARGET_CURRENT_DETECT | P0606 | This monitor checks if:<br>When any ABS ISOs, NO DAP or PEDAL_SIM solenoids are:<br>• Shorted Solenoid OR<br>• Open Solenoid Driver OR<br>• Open Flyback diode OR<br>• Power input to module is noisy | tests all pass on next ignition cycle | Periodically (e.g. once per ignition cycle), the MCU commands the maximum coil current with the solid state relay off for three, 5ms SW loops. SW checks the "CC_DRx High Target Unreachable" SPI flag each 5ms SW loop from time of the first maximum current command to two loops afterthe third command loop (i.e. 5 loops total). At any point, if the "CC DRx High Target Unreachable" SPI flag is read back high, the High Target Current Unreachable diagnostic test passes, and the remainder of the High Target Current Unreachable test (command and flag read backs) are aborted. If the "CC_DRx High Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails. Periodically (e.g. once per ignition cycle), the MCU shall command the minimum non-zero coil current with the solid state relay on for three, 5ms SW loops. SW shall check the "CCD Rx LowTarget Unreachable" SPI flag each 5ms SW loop from time ofthe first minimum current command to two loops afterthe third command loop (i.e. 5 loops total). At any point, if the "CC_DRx Low Target Unreachable" SPI flag is read back high, the Low Target Current Unreachable diagnostic test passes, and the remainder of the LowTarget Current Unreachable test (command and flag read backs) are aborted. If the "CC_DRx Low Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_DRIVER_SHORT_DETECT | P0606 | This monitor checks if:<br>• Defective system ASIC | • The ASIC shall not automatically inhibit the Shorted Driver Detection (SM37) when the SSR is off. | Periodically (e.g. once per ignition cycle), the MCU shall disable the SSR, enable the CC_DRx and DROx drivers, command 0A or 0% duty cycle, and verify that the Open Coil / Shorted Driver Warning Valid bits are set, and verify that a Shorted Driver Warning is reported on each driver channel. | • Polaris is initialized | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_SSR_SELF_TEST_FAILED | P0604 | This monitor checks if:<br>• Solid State Relay problem<br>• Defective ASIC<br>aDY~Drxrz'klrx™ | •The MCU performs various tests on the Solid State Relay during System Self Test. | (Ia) Se/Command: Watchdog Counter Value SPI field = 0, WDEN pin low, the Enable Failsafe SSR SPI bit = 0, and the SSR Shut Off Pin low (= off).<br>(Ib) Verify the Coil Supply Voltage is low. | • Runs during initialization | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_WDOG_COUNT_TEST_FAILED | P0606 | This monitor checks if:<br>• Watchdog problem<br>• Defective ASIC<br>• PCB problem | • This fault tests the watchdog by purposefully allowing the watchdog to time out and checking to see how the watchdog reacts | Allow the Watchdog to timeout. Timeout shall occur 34ms to 42ms after the last watchdog service occurred, The time taken to timeout the watchdog counter should be counted toward the required timeout time. If the time is not in a range of 34 to 42 msec this fault should set | • Runs during initialization | 34 msec | Type A. MIL Illumination. |
| WDOG_DYNAMIC_TEST_FAILURE | P0606 | This monitor checks if:<br>• Defective printed circuit board.<br>• Defective ASIC.<br>• Defective microprocessor. | •Watchdog Dynamic Test Failure<br><br>• The micro sends a bad watchdog response value back to the ASIC periodically to verify that the ASIC does move towards disabling the system when the watchdog is not correctly being updated. Each loop, the watchdog status counter is checked. After the bad value is | If the ASIC operation has not moved towards disabling the system, the logic assumes that the watchdog is not able to function properly. As a result, the logic disables the system because the watchdog operation cannot be assumed to be correct. | • Power Switch is ON | 10 msec | Type A. MIL Illumination. |
| SYS_ASIC_LOG IC_RST_STUCK_DETECT | P0606 | This monitor checks if:<br>• Reset source register problem<br>• ASIC problem<br>• DC'Rnrnhlam | • The MCU continuously monitors the External LOGIC_RST Reset SPI bit within the Reset Source Register. | The MCU shall read the ASIC's External LOGIC_RST Reset SPI field.<br><br>If the SPI bit is high, fault is set. | • Continuous failsafing | 15 msec | Type A. MIL Illumination. |
| MULTIPLE_STARTUP_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, any different test or procedure fails then a MULTIPLE_STARTUP_FAILURE is latched | Any two different Safety Test flags are reported as FAILED in two consecutive tests | Enabled at power up | 1 count | Type A. MIL Illumination. |
| SBST_CORE2_FAILURE | P0606 | This monitor checks if:<br>Failure ofthe CPU core | Fault is set if SafeTlib test "CpuTst_CpuSbstPTst()" fails | Every 1 second the SafeTlib test "CpuTst_CpuSbstPTst()" is run. The fault is set if it returns a failure. | Continous - Always enabled | 1 Count | Type A. MIL Illumination. |
| UNIMPLEMENTEDJNTERRUPT-COREO | P0606 | This monitor checks if:<br>Defective CPU | When the failsafe is called during runtime, it will loop through all the SRC registers to find if there is any pending interrupt from disabled interrupt source | IfSRPNbits in SRC register of Interrupt router is zero then the fault will set if SRR bit of SRC register is set | Continuous Failsafing | 300 counts | Type A. MIL Illumination. |
| ADC_FAILURE | P060B | This monitor checks if:<br>• Defective CPU | Fault sets under the following circumstances: An AD pin is read. Using the Conversion Diagnostics, a pull down is tied to the pin and read again. Then, a pull up is tied to the pin, and read again. Then, the pull devices are removed, and the pin is read a 4th time. The [illegible] | If (pulled down value read > initial value read * 0.8) OR If (pulled up value read < initial value read * 1.2) OR If (reread value > initial value read*1.03) OR If (reread value < initial value read *0.97) THEN Set ADC_FAILURE | performed at power up | 1 count | Type A. MIL Illumination. |
| RESET_SSCHECK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | After a warm reset the RSTCON2.CSS bits are checked. If any are 0, then the fault will be set | If (warm reset == TRUE) AND (RSTCON2.CSS == 0) | performed at power up | 1 count | Type A. MIL Illumination. |
| SPB_FAILURE | P0606 | This monitor checks if:<br>failed System Peripheral Bus | The correct value of different registers shall be tested to ensure the proper functioning ofthe SPB address lines. Fault set if any ofthe registers have an unexpected value after 5 consecutive checks in the 20 ms task . | Each ofthe required registers will be read during runtime to see if they provide the expected value that was loaded during initialization. | Power Switch is ON | 100msec | Type A. MIL Illumination. |
| SMU_CONFIG_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | afterthe SMU has been initialized it will loop through a table ofSMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be [illegible] | register value is not equal to test value written to it | performed at power up | 1 count | Type A. MIL Illumination. |
| SBCU_CONFIG_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | afterthe SMU has been initialized it will loop through a table ofSMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be [illegible] | register value is not equal to test value written to it | performed at power up | 1 count | Type A. MIL Illumination. |
| WDT_CONFIG_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | On initialization: One or more of these Safety Watchdog registers has an incorrect value:<br>WDTSCONO.REL<br>WDTSCON1.IRO<br>wnTcrnM-i iqi | any register has an incorrect value for four consecutive checks | Enabled at power up | 4 count | Type A. MIL Illumination. |
| CPU_BUS_MPU_CONFIG_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | afterthe MPUhas been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be [illegible] | register value is not equal to test value written to it | performed at power up | 1 count | Type A. MIL Illumination. |
| LMU_MPU_CONFIG_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | afterthe MPUhas been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be [illegible] | register value is not equal to test value written to it | performed at power up | 1 count | Type A. MIL Illumination. |
| PB_MICRO_REGISTER_READBACK_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | The ECU provides the capability to ensure the data integrity of register configuration.<br>The software shall ensure the data integrity ofthe register configuration and compare the calculated checksum against an expected value. | register value is not equal to test value written to it | performed at power up | 1 count | Type A. MIL Illumination. |
| SAFETY_LIB_DETECTED_FAIL URE | P0606 | This monitor checks if:<br>• Defective CPU | The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If afterthe reset, the same test or procedure fails then a SAFETY_LIB_DETECTED_FAILURE is latched | Anyone Safety Test flag is reported as FAILED in two consecutive tests | Enabled at power up | 1 count | Type A. MIL Illumination. |
| STM_PLAUSIBILITY_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | STM and TBU timers are read without interrupt between, then after 20 ms, STM andTBU elaspsed times are read without interrupt between the readings, the 2.5% error is checked and Up/down failsafe monitor function is called. The fault is continiously checked every 20 me | The difference between the System Timerand Time Base Unit channel 1 >=2.5% | Enabled at power up | 105 msec | Type A. MIL Illumination. |
| EVR_CFGMON_FAILURE | P0606 | This monitor checks if:<br>• Defective CPU | The Power Management Status Register is checked at power-up. Two configuration bits are checked. Also the EVR Active flag is checked. | If any of the checked flags are FALSE then the fault is set immediately | performed at power up | 1 count | Type A. MIL Illumination. |
| RAM_STARTUP_MBIST_FAILURE | P0604 | This monitor checks if:<br>• Defective CPU | The micro runs a RAM self test at power-up. If a failure is detected the the BIST is rerun after a warm reset. If a failure still exists then the failed bit will be set | If the failed bit is TRUE then set the fault | performed at power up | 1 count | Type A. MIL Illumination. |
| MD_PU_I_SENSE_COMMON_MODE_FAULT | C0596 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>aDori mr-ifr-ir | If {common mode Isense offset - zero Isense offset} is outside the normal range (+/-SPUT_ISENSE_MAX_CM_ISHIFT), this fault is set. | If the current sampled at power-up with an injected common mode l-sense offset (positive & negative together), is outside +/- maximum common mode offset range (from the zero offset reading), this fault is raised. | Battery voltage between 7.1vand 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD PU I SENSE NEGATIVE FAULT | C0596 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | If{zero Isense offset - negative Isense offset} is outside the normal range (SPUT_ISENSE_MIN_NEG_ISHIFT to SPUT_ISENSE_MAX_NEG_ISHIFT), this fault is set | Ifthecurrent sampled at power-up with an injected negative I-sense offset, is outside minimum to maximum negative offset range (from the zero offset reading), this fault is raised. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD-PUJ _SENSE_POSITIVE_FAULT | C0596 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Rod motor | If {positive Isense offset - zero Isense offset} is outside the normal range (SPUT_ISENSE_MIN_POS_ISHIFT to SPUT_ISENSE_MAX_POS_ISHIFT), this fault is set. | Ifthecurrent sampled at power-up with an injected positive I-sense offset, is outside minimum to maximum positive offset range (from the zero offset reading), this fault is raised. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD IEMO CCU RRENC EFAULT | C0582 | This monitor checks if:<br>• Bridge FET failure<br>• Invalid execution rate of a motor interrupt. | Compares the number of times each electric drive interrupt has occurred in a 4ms period, and sets ifthe interrupt count does not fall in an acceptable range | The occurrence counter of any enabled motor interrupt is outside an expected interval. | ECUis not shutting down. | 1 count/4 ms | Type A MIL Illumination. |
| MD_IEM_PLAUSIBI LITY_FAULT | C0582 | This monitor checks if:<br>• Bridge FET failure<br>• Invalid execution reason of a motor interrupt. | This fault sets ifa motor control interrupt isexecuted withthewrong proirity level, oran interrupt isexecuted when it should be disabled. | Either a motor interrupt has been executed which wasn't explicitly enabled. | Motor Drive is in either "Running" or "Paused" state (i.e. notin "Init" or intermediate "Resuming" or "Terminated" state) | 1 count | Type A MIL Illumination. |
| MD_MOTOR_PHASE_VOLTAGE_1 _HIGH_FAULT | C057F | This monitor checks if:<br>Bridge FET failure | When phase 1 voltage is high, the microcontroller shall capture {M1_PH1_SEN phase voltage high}, if {M1_PH1_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. | M1_PH1_SEN phase voltage high < 3.46V | executed when the Inverter FET is switched on.<br>Motor PWM is on | 18 msec/128 counts | Type A MIL Illumination. |
| MD -MOTO R_P HAS E_VO LTAG E_1 _LOW_FAULT | C0580 | This monitor checks if:<br>Bridge FET failure | When phase 1 voltage is low, the microcontroller shall capture {M1_PH1_SEN phase voltage low}, if {M1_PH1_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised | M1_PH1_SEN phase voltage low > 0.99V | executed when the lower Inverter FET is switched on.<br>Motor PWM is on | 18 msec/128 counts | Type A MIL Illumination. |
| MD MOTOR PHASE VOLTAGE 2 HIGH FAULT | C057F | This monitor checks if:<br>Bridge FET failure | When phase 2 voltage is high, the microcontroller shall capture {M1 PH2 SEN phase voltage high}, if {M1_PH2_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. | M1 PH1 SEN phase voltage high < 3.46V | executed when the Inverter FET is switched on. | 18 msec/128 counts | Type A MIL Illumination. |
| MD -MOTO R_P HAS E_VO LTAG E_2_LOW_FAU LT | C0580 | This monitor checks if:<br>Bridge FET failure | When phase 2 voltage is low, the microcontroller shall capture {M1_PH2_SEN phase voltage low}, if {M1_PH2_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. | M1_PH1_SEN phase voltage low > 0.99V | executed when the lower Inverter FET is switched on. | 18 msec/128 counts | Type A MIL Illumination. |
| MD_MOTOR_PHASE_VOLTAGE_3_HIGH_FAULT | C057F | This monitor checks if:<br>Bridge FET failure | When phase 3 voltage is high, the microcontroller shall capture {M1_PH3_SEN phase voltage high}, if {M1_PH3_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. | M1_PH1_SEN phase voltage high < 3.46V | executed when the Inverter FET is switched on. | 18 msec/128 counts | Type A MIL Illumination. |
| MD -MOTO R_P HAS E_VO LTAG E_3_LOW_FAULT | CO580 | This monitor checks if:<br>Bridge FET failure | When phase 3 voltage is low, the microcontroller shall capture {M1_PH3_SEN phase voltage low}, if {M1_PH3_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. | M1_PH1_SEN phase voltage low > 0.99V | executed when the lower Inverter FET is switched on. | 18 msec/128 counts | Type A MIL Illumination. |
| MD_PU_PHASE_1_STUCK_HIGH_FAULT | C057F | This monitor checks if:<br>• Top FET shorted<br>•Top FET drive stuckonor<br>• Dhoca canca ctiiak hinh | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Flrix/a c+ana rxrxxA/ar iirx tactc nanfirm that IA/ith all CCTc aff nn rxhacac ara Hrix/an Dhaca | Ifthe motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_PU_PHASE_1 _STUCK_LOW_FAULT | C0580 | This monitor checks if:<br>• Bottom FET shorted<br>•Bottom FET drive stuckonor<br>• Ddnca oarxea e+ilalz lax*/ | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Driwa c+nna nrxxx/ar11n tactc aarxfirrrx that XA/i+hall CCZTc aff rxrx rxhacac ara Hrixzarx Dhaca | Ifthe motor phase 1 voltage is near to Ov, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_PU_PHASE_2_STUCK_HIGH_FAULT | C057F | This monitor checks if:<br>• Top FET shorted<br>•Top FET drive stuckonor<br>• Dhnco canca xctilalz hinh | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Drix/a ctarxa nrxxA/ar ir> tactc aarxfirm that xAri+hall CCTc aff rxa rxhacac ara Hrixzarx Dhaca | Ifthe motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_PU_PHASE_2_STUCK_LOW_FAULT | C0580 | This monitor checks if:<br>• Bottom FET shorted<br>•Bottom FET drive stuckonor<br>• Dhoca canca ctiirk l/iiaz | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Drixza c+aaa rxaxA/ar iirx facte r'anfirm that XA/ith all CCTc off rxa rxhacac ara Hrixzarx Dhaca | Ifthe motor phase 2 voltage is near to Ov, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_PU_PHASE_3_STUCK_HIGH_FAULT | C057F | This monitor checks if:<br>• Top FET shorted<br>•Top FET drive stuckonor<br>• Dhoca canca ctiirlz hinh | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Rrix/c c+aaa rxaxA/ar iirx tactc nanfirm that XA/ith all RRTc aff rxa rxhacac ara drix/an Dhaca | Ifthe motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_PU_PHASE_3_STUCK_LOW_FAULT | C0580 | This monitor checks if:<br>• Bottom FET shorted<br>•Bottom FET drive stuckonor<br>• Dhaoa canca ctiicl/ lax*/ | Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit<br>Drix/a c+aaa rxaxA/ar iirx+ac +c aarx+xrrrx that XA/ith all CCZTc aff rxa rxhacac ara drix/arx Dhaca | Ifthe motor phase 3 voltage is near to Ov, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised. | Battery/link between 7.1v and 18v | 400 ms | Type A MIL Illumination. |
| MD_P U_BRIDGE_B H1_UV_FAU LT | C0580 | This monitor checks if:<br>• ECU hardware failure | Bridge driver boostrap high side 1 capacitor under voltage fault reported during Bridge driver configuration. | With bridge enabled and SOFF off, the FET IL1 is driven for 20Ous. After 200us, "high side buffer capacitor 1 under voltage" error in internal error register is still set. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD_PU_BRI DGE_ERR_STUCK_HI_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver ERR line connectivity<br>• Bridge driver incorrect operation. | Verify Error line goes active (low), when error condition is injected. | During self test, the Bridge Driver HW error output pin (IOHWAB_BRIDGE_1_ERROR) was not active, when Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 32 ms | Type A MIL Illumination. |
| MD_PU_BRI DGE_ERR_STUCK_LO_ FAULT | C0582 | This monitor checks if:<br>• Bridge Driver ERR signal connectivity. | Verify Error line goes inactive (high), when injected error condition is removed. | When Bridge configuration is started by driving the HW output Pin (IOHWAB_BRIDGE_1J NH IBIT) inactive, theHW Input Pin (IOHWAB_BRIDGE_1_ERROR) stays active. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 20 - 30ms | Type A MIL Illumination. |
| MD_PU_BRIDGE_INIT_TIMEOUT_FAULT | C0582 | This monitor checks if:<br>• Micro controller SPI failure.<br>• Bridge Driver failure. | Verify Bridge Driver initialization completed within SPUT_DRV_INIT_MAX_TIME. | If initialization of the bridge driver doesnot occur within 100ms@ 1ms /bit | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD_PU_BRIDGE_MAX_POWER_DOWN_FAULT | C0582 | This monitor checks if:<br>• Incorrect Bridge Driver operation | Allow only BD_PU_MAX_POWER_DOWN_CYCLES of retry, during Bridge Driver power up sequence. | the number of power down cycles during abridge driver power up sequence exceeds 3 | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD_PU_BRI DGE_OC_TIMEOUT_FAULT | C0582 | This monitor checks if:<br>• Incorrect Bridge Driver operation | Verify intermediate over current tests are completed within SPUT_DRV-OVE R_CUR RENT_M AX_TIME. | Immediate overcurrent tests are not completed within 10ms@ 0.1 us/bit | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2 counts/2ms | Type A MIL Illumination. |
| MD_PU_BRI DGE_OCT_NOT_COMPLETED | C0582 | This monitor checks if:<br>• Incorrect Bridge Driver operation | Verify over current test is completed within SPUT_DRV_OCT_MAX_EXECUTION_TIME. | overcurrent tests are not completed within 50ms @ 0.1 us/bit | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2 counts/2ms | Type A MIL Illumination. |
| MD_PU_BRI DGE_UNACCEPTABLE_ERR | C0582 | This monitor checks if:<br>• Incorrect Bridge Driver operation | Verify no un-acceptable errors are reported by Bridge device during power up. | Ifthe below unacceptable error bits are set.<br>- Global test mode (gtm)<br>- Overvoltage Internal Regulator 6 Error (err_ov_reg6)<br>-Charge Pump 1 Overload Error(err_cp1 )<br>- Charge Pump 2 Overload Error (err_cp2)<br>- Overtemperature Shutdown (sd_ot)<br>-Charge Pump Overvoltage Shutdown at Pin CBorPin CH2-CL2 (sd_ov_cp),<br>- Vs Path Charge Pump Input Overload (sd_cp1 ),<br>- Overtemperature Detection (err_ot_w)<br>-Latent Fault Warning (lfw)<br>-Error Correction of Control Register Failed(ctrl_ reg_ invalid),<br>- err_ov_ld_vdh in External Errors. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 3 counts/3ms | Type A MIL Illumination. |
| MD_PU_I SENSE_ZERO_OFFSET_FAULT | C0596 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• RnrJ matar | Zero I sense outside valid range<br>The microcontroller shall test that while M1JTP (positive) offset is inactive and M1JTN<br>Zrxaaatix/aX affcaf ic irxactix/a +<1*1 IQIZMQD *1 /"rar a 1 carxca a++ca+\ ic XA/ifhirx | zero Isense offset (M1J SENSE_1 ) is outside the normal range | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1 ms | Type A MIL Illumination. |
| MD_PU_MCU_FET_OP_STUCK_ON_FAULT | C0582 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Ra/4 mntrxr | While bridge driver is enabled and prior to driving top or bottom FETs a power up test shall be performed to check no top or bottom FET is stuck on<br>Turn all FETs off (MCU outputs off, bridge should drive FETsoff) Monitor phasevoltage<br>XA/hathar ic hiah/laxA? | Top and Bottom FET stuck on during a Power up test. ( Phase voltage is high when FETs are turned OFF) | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 400 ms | Type A MIL Illumination. |
| MD_PU_B RIDGE_CONFIGSTATE_CHG_FAU LT | C0594 | This monitor checks if:<br>• Micro controller SPI failure.<br>• Bridge Driver failure. | This failsafe guarantees that the bridge driver is in an acceptable mode (Normal, Safe Off, Config, or Error) during the power-up test sequence. Unknown, Idle, Config Lock, Self Test, Rectification, and Sleep modes will cause this fault to latch. | Bridge Driver remains in "Idle Mode" for 5ms in which it was expected that ittransitsto "Configuration Mode", after the configuraion has been sent via SPI. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 145 ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD PU BRIDGE OVER CURRENT FAULT | CO590 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | This failsafe tests that over current detection on the bridge driver is working as it should. This failsafe operates during the power-up test. | Self test was started<br>and<br>Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value<br>and<br>bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was active, but over current fault bit was not set in sBridgeDriver.CurrentSenseAmpErrorStatus.<br>OR<br>Self test was starteda ndCurrent Sense Amplifier 1&2 - Gain 2 was set to a valid value<br>and<br>bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was inactive, but over current fault bit was set in sBridgeDriver.CurrentSenseAmpErrorStatus. | Battery voltage between 7.1vand 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 40 msec | Type A MIL Illumination. |
| MD_MOTOR_OPEN_PHASE1 _FAULT | CO591 | This monitor checks if:<br>• Open Phase | d-axis and q-axis demand is compared with phase 1 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault | Low Speed Detection (0rpm..400rpm):<br>average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID OPEN_PHAS E_ERR_TH RESH OLD)<br>AND<br>maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND<br>last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD)<br>AND<br>motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) | • NOT in Motor Open Phase Back-Up Mode<br>AND<br>• motor mechanical speed < 2400 rpm (MAX_ME CH_SP D_OPEN_PHASE_DIAG_EN )<br>AND<br>• ECU assist enabled | 4 counts/4ms | Type A MIL Illumination. |
| MD_MOTOR_OPEN_PHASE2_FAULT | CO591 | This monitor checks if:<br>• Open Phase | d-axis and q-axis demand is compared with phase 2 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault | Low Speed Detection (0rpm..400rpm):<br>average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID OPEN_PHAS E_ERR_TH RESH OLD)<br>AND<br>maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND<br>last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD)<br>AND<br>motor phase 2 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) | • NOT in Motor Open Phase Back-Up Mode<br>AND<br>• motor mechanical speed < 2400 rpm (MAX_ME CH_SP D_OPEN_PHASE_DIAG_EN )<br>AND<br>• ECU assist enabled | 4 counts/4ms | Type A MIL Illumination. |
| MD_MOTOR_OPEN_PHASE3_FAULT | CO591 | This monitor checks if:<br>• Open Phase | d-axis and q-axis demand is compared with phase 3 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault | Low Speed Detection (0rpm..400rpm):<br>average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID OPEN_PHAS E_ERR_TH RESH OLD)<br>AND<br>maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND<br>last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD)<br>AND<br>motor phase 3 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) | • NOT in Motor Open Phase Back-Up Mode<br>AND<br>• motor mechanical speed < 2400 rpm (MAX_ME CH_SP D_OPEN_PHASE_DIAG_EN )<br>AND<br>• ECU assist enabled | 4 counts/4ms | Type A MIL Illumination. |
| MD_MOTOR_I_SENSE_DYNAMIC_COMM_MODE_FAULT | CO582 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | If ({common mode I-sense offset} - {zero I-sense offset}) is outside RT_ISENSE1_MAX_CM_ISHIFT_RANGE then this fault is raised.<br><br>reference value is taken before applying both voltage offsets (Common), diagnostic_sample nnint io monoiiro/d if riio/-ir»/"\ofio onmnln rofaranro J-Z throohnl/d thon rnioa ofoiilf | Either current sample is outside a valid range set by the respective reference sample plus /minus [-35A (DM_ISenseRtMaxCmlShiftNeg)...+35A (DMJSenseRtMaxCmlShiftPos)] | • ECU assist enabled<br>AND<br>• ECU is not initializing or shutting down | 4count/16ms | Type A MIL Illumination. |
| MD_MOTOR_I_SENSE_DYNAMIC_POSITIVE_FAULT | CO582 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Rod mnfnr | If{M1JSENSE1 positive offset current} is outside expected limits then this fault is raised.<br><br>reference value is taken before applying positive voltage offset (P), diagnostic_sample point ic manciirad if rnfaranra ic mt cotiirotcxrl onrl if rl ion nnctin comnla s' rafaranra -1- thrachalrl | the absolute current sample during test is lower than the induced offset | • ECU assist enabled<br>AND<br>• ECU is not initializing or shutting down | 4count/16ms | Type A MIL Illumination. |
| MD_MOTOR_I_SENSE_DYNAMIC_NEGATIVE_FAULT | CO582 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>a Dnrl mnti-ir | If{M1JSENSE1 negative offset current} is outside expected limits then this fault is raised.<br><br>reference value is taken before applying negative voltage offset (N), diagnostic_sample point b monoiirncl if mfnmnnn io not ontiintad nncl t H innnnotir' onmnlo 's. mfaronna j- iRrooRolrl | the absolute current sample during test is lower than the induced offset | • ECU assist enabled<br>AND<br>• ECU is not initializing or shutting down | 4count/16ms | Type A MIL Illumination. |
| MD_MOTOR_POSITION_SENSOR_FAULT | C058A | This monitor checks if:<br>• The MPS indicates a failure or a "not normal" mode<br>• Thn MDQ hno rlatar'tarl nn internal nrnklam | SPI error bits set during communication with MPS, or CRC error detected in SPI message. | mode_not_normal or fail bits set, incorrect CRC calculation, or invalid MPS data | • ECU is not shutting down. | 5 msec | Type A MIL Illumination. |
| MD_MOTOR_POSITION_MISSING_CALIB_FAULT | C2A1C | This monitor checks if:<br>• Malfunctioning MPS<br>• Unpowered MPS | The motor position sensor electrical offset calibration has failed or has not yet been completed | •Fail if motor position calibration state = MPS_CALIB_OFF, MPS_CALIB_FAILED_VARIANCE, or MPS_CALIB_FAILED_FORWARD<br>• Pass if motor position calibration state = MPS_CALIB_COMPLETED | • ECU is not shutting down. | 1 ms | Type A MIL Illumination. |
| MD_MOTOR_POSITION_SENSOR_EEPROM_FAULT | C058A | This monitor checks if:<br>• Malfunctioning MPS<br>• Unpowered MPS | • SPI error bits set during communication with EEPROM on MPS sensor, or incorrect data fingerprint found in EEPROM data read from sensor | o QSPIO_STATUS bit 3 or bit 6 are set during communication with EEPROM<br>o EEPROM identification page[0] != 0x20 \|\| EEPROM identification page[1] != 0x00 \|\| EEPROM identification page[2] != 0x09 | N/A | 1 count | Type A MIL Illumination. |
| MD_ISENSE_CROSS_CHECK_FAULT | CO582 | This monitor checks if:<br>• Current Sense Circuitry | The microcontroller shall capture M1JSENSE1 and M1JSENSE2 current samples, if average difference between M1JSENSE1 and M1JSENSE2 over five samples is greater than RT_ISENSE_CROSS_CHECK_LIMIT, then this fault is raised and assist removed<br><br>reads two independent ADC by 5 samples and averages it to measure current flow and compares, if difference is more than allowed, | The sum of the error between phase current samples (internal and external amplifier) is not in the range [-47A (MIN_ISENSE_DIFFERENCE) ...+47A (MAX_I SENSE_D IFFERENCE)]<br><br>OR<br><br>no new data from current sensors received | • ECU assist enabled<br>AND<br>• ECU is not initializing or shutting down | 20 counts/80ms | Type A MIL Illumination. |
| MD_IEM_SEQUENCE_ERROR_FAULT | CO595 | This monitor checks if:<br>• Interrupt failure | Motor Control tasks are deemed to not be executing in the correct order.<br><br>For every configured interrupt, read out any complete sequences that are in the log. For each sequence read out, the CRC is calculated for the observation points, and is compared against the expected value for that interrupt/mode. Mode is determined from the first observation point in the sequence | Whenever a motor interrupt is entered and exited, everytime it writes a unique number into a rolling buffer. The diagnostic calculates the CRC over complete interrupt sequences (depending on the motor state) in the buffer and raises a fault if there is a mismatch. | • ECU is not shutting down | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CLOCK_FAIL_FAULT | CO595 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time Bridge Driver reports internal clock failure (using ERR line and SPI error registers). | • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CONFIG_COMP_FAULT | CO595 | This monitor checks if:<br>• Bridge Driver incorrect operation. | To ensure correct configuraiton data is written into Bridge Driver IC.<br>Configuration failure detection is required in order to mitigate:<br>- Micro controller SPI failure.<br>- Bridge Driver failure.. | During initialization, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault. | Battery voltage between 7.1vand 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 3 counts/3ms | Type A MIL Illumination. |
| MD_BRIDGE_CONFIG_ERROR_FAULT | CO595 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time Bridge Driver reports config error (using ERR line and SPI error registers). | • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR)<br><br>AND<br><br>• SPI status "config valid" bit is not set<br><br>AND<br><br>• the fault has occurred more than once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CONFIG_INVALID_FAULT | CO595 | This monitor checks if:<br>•Incorrect CRC transmitted during initialisation.<br>• Micro controller SPI failure.<br>a Rri/drio fTrix/ar foillira | During initialisation, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault. | Bridge Driver has entered the "Configuration Lock Mode" during configuration. | Battery voltage between 7.1vand 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 3 msec | Type A MIL Illumination. |
| MD_BRIDGE_CONFIG_STALLED_FAULT | CO595 | This monitor checks if:<br>• Micro controller SPI failure.<br>• Bridge Driver failure. | Verify configuration check is completed within BRIDGE_DRV_CFG_STALLED_TIMEOUT. | Bridge Driver configuration data check was not completed within 20ms. | Battery voltage between 7.1vand 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 200 ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD_BRIDGE_CB_UNDER_VOLTAGE_FAULT | C0580 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time, the Bridge Driver reports charge pump buffer under voltage error on the CB pin of the Bridge driver ASIC (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHW AB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>(In register shutdown error "CB undervoltage shutdown" is set<br><br>AND<br><br>In register internal error "CB undervoltage detection error" is set). | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MDBRIDGECFBRIDGECONFIGFAULT | C0595 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time Bridge Driver reports error (using ERR line and SPI error registers). | • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR)<br><br>AND<br><br>• SPI status "config valid" bit is not set<br><br>AND<br><br>• the fault has occurred more than once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CF_BRIDGE_ECC_FAULT | C0595 | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time Bridge Driver reports error (using ERR line and SPI error registers). | special event register of bridge driver indicates that error correction of control register failed<br><br>AND<br><br>the fault has occurred more than once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CF_REG1_OVER-VOLTAG E_FAULT | C057F | This monitor checks if:<br>• Bad Motor Driver Circuit<br>• Bad motor driver ASIC<br>• Bad motor | During run time Bridge Driver reports error (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal errors "overvoltage internal regulator 1 error" is set<br><br>AND<br><br>the fault has occurred only once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_REFERENCE_VOLTAGE_FAULT | C0580 | This monitor checks if:<br>• Micro controller<br>• Bridge Driver amplifier reference voltage ADC fail)ire | Verify Bridge Driver reference voltage is within limits. | HW Pin for reference voltage (IOHWAB_BRIDGE_1_REF_VOLTAGE) is not between 2.25V and 2.75V. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 18ms/128 counts | Type A MIL Illumination. |
| MD_BRIDGE_3V3_UNDER_VOLTAGE_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Monitor Bridge Driver reporting under voltage error on its VCC (V3V3)pin. | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register external errors "VCC Undervoltage Detection Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_3V3_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation. | Bridge Driver is reporting over voltage on its VCC (V3V3) pin. | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register external errors "VCC Undervoltage Detection Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_ERR_STUCK_LO_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver ERR line connectivity<br>• Bridge driver incorrect operation. | Check M1_BD_ERR line state. | During self test, the bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR), when Current Sense Amplifier 1&2 - Gain 2 (=BD_REG_OP_GAI_2) was set to a valid value. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 3 msec | Type A MIL Illumination. |
| MD_BRIDGE_VS_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation<br>• Battery Voltage | During run time Bridge Driver reports VS overvoltage error (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>(In register shutdown error "Vs Overvoltage Shutdown" is set<br><br>OR<br><br>In register external error "Vs Overvoltage Detection Error" is set). | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_VS_UNDER_VOLTAGE_A_FAULT | P0562 | This monitor checks if:<br>• Low battery voltage | Bridge driver will detect undervoltage condition. The software shall interrogate the Bridge Driver to determine whether the fault is valid and if valid raises the fault. | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register external errors "Vs Undervoltage Detection Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 18ms/128 counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MD_BRIDGE_VS_UNDER_VOLTAGE_B_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports VS under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VSU_UV_DETECT_THRESHOLD. | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register external errors "VS Undervoltage Detection Error" is set<br><br>AND<br><br>battery voltage is >= 6.5V. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_VOLTAGE_TOO_HI_EVENT | P0563 | This monitor checks if:<br>High battery voltage | Bridge voltage state is checked to see if it is normal. Then is checked for sustained abnormal battery voltage.<br>If battery voltage is higher than high pause threshold for high pause holdoff period, and the trnnc ont writono throchoM io in ica ZKrHnolimtnt HOZA than "tan KinK"aVantio | Voltage at bridge driver > 26.0V | • Motor power switch on<br>AND<br>• ENQ pin active | 1 count/1ms | Type B. MIL Illumination. |
| MD_BRIDGE_VDHP_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation<br>• Battery Voltage | During run time Bridge Driver reports VDHP overvoltage error (using ERR line and SPI error registers). | • The voltage on the VS pin of the bridge driver ASIC is above 39.95V<br><br>• Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>(In register shutdown error "VDHP Overvoltage Shutdown" is set<br><br>AND<br><br>In register external error "VDHP Overvoltage Detection Error" is set). | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD_BRIDGE_VDHP_UV_A_FAULT | C0580 | This monitor checks if:<br>• Excessive local temperature OR failures that cause incorrect detection of over temperature. | Data read from Bridge Driver over SPI indicates an undervoltage on the VDHP pin of the Bridge Driver ASIC. | • The voltage on the VS pin of the bridge driver ASIC is below 3.96V<br><br>• Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register External errors "VDHP Undervoltage Detection Error" is set | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 18msec/128 counts | Type A MIL Illumination. |
| MD_BRIDGE_VDHP_UV_B_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports VDHP under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VDHU_UV_DETECT_THRESHOLD. | • The voltage on the VS pin of the bridge driver ASIC is below 3.96V<br><br>• Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register External errors "VDHP Undervoltage Detection Error" is set<br><br>AND<br><br>battery voltage is > 6.5V. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_UNDEFINED_ERROR_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time SPI error status flag OR Bridge ERR line is active, but no faults are reported in SPI error registers. | Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1 ms | Type A MIL Illumination. |
| MDBRIDGEUNEXPECTEDMODEFAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Bridge Driver reports unexpected state. | Below conditions are not satisfied.<br><br>((sBridgeDriver.ICMode == BRDG_NORMAL_OPERATION) \|\|<br><br>(sBridgeDriver.State == BD_SHUTDOWN) \|\|<br><br>((sBridgeDriver.ICMode == BRDG_ERROR_MODE) &&<br>(IOHWAB_BRIDGE_1_ERROR == ACTIVE))) | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 16 counts/ 16ms | Type A MIL Illumination. |
| MD_BRIDGE_UNEXPECTED_STATE_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Verify Bridge driver state is as expected during initialisation. | Bridge driver mode is not at the expected state during configuration. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 3 counts / 3 ms | Type A MIL Illumination. |
| MD_BRIDGE_SOFF_STUCK_LO_FAULT | C0582 | This monitor checks if:<br>• M1_BD_SOFF signal not working correctly. | Check bridge driver status is reported as "normal" mode" when M1_BD_SOFF is inactive. | When bridge test pin (IOHWAB_BRIDGE_1_TEST) is driven active, bridge driver state (sBridgeDriver.State) did not change to BD_NORMAL. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2 counts /2ms | Type A MIL Illumination. |
| MD_BRIDGE_SPI_MSG_FAILED_FAULT | C0595 | This monitor checks if:<br>• Bridge Driver incorrect operation<br>• Microcontroller SPI failure. | Bridge Driver reports SPI errors (using SPI error registers) OR received SPI message CRC is invalid. | ("SPI error flag" is set in SPI status<br><br>AND<br><br>Either "Invalid Address Access", "SPI Time-out', "SPI Frame error", "SPI Time-out", "SPI CRC error" is set in SPI communication and configuration error register)<br><br>OR<br><br>Invalid SPI response is received. | Ignition State = ON<br><br>OR<br><br>Wake ON CAN | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_SPI_RESP_TIMEOUT_FAULT | C0595 | This monitor checks if:<br>• Incorrect low level SPI driver operation. | Verify Bridge Driver low level SPI communication is working. | Low level SPI driver is not responding. | (Ignition State = ON<br>OR<br>Wake ON CAN<br>aKin | 1 count/1 ms | Type A MIL Illumination. |
| MD_BRIDGE_REG_UNDER_VOLTAGE_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports internal regulator under voltage error (using ERR line and SPI error registers), but battery voltage is greater than<br>B D J R U U V D E T E C T T H R E S H O L D. | • Bridge Driver internal regulator voltage < 6.5V @1/256V/bit<br><br>• Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal error "Undervoltage Internal Regulator 4 or 5 or 6 Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1 ms | Type A MIL Illumination. |
| MD_BRIDGE_REG1_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal errors "overvoltage internal regulator 1 error" is set<br><br>AND<br><br>the fault has occurred only once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1 ms | Type A MIL Illumination. |
| MD_BRIDGE_REG6_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal errors "overvoltage internal regulator 6 error" is set | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the | 1 count/1 ms | Type A MIL Illumination. |
| MD_BRIDGE_OVER_CURRENT_FAULT | C0590 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Bridge Driver reporting amplifier over current errors. | IOHWAB_BRIDGE_1_ERROR is active<br><br>OR<br><br>in SPI status "error flag" is set<br><br>AND<br><br>In register current sense amplifier errors "err_oc_op1 orerr_oc_op2 or err_oc_op3" are set. | EcuC.rootState_active == EcuC_MotorDriveOn<br><br>AND<br><br>DrvStg.SafeStateRequired == FALSE<br><br>AND<br><br>Battery Voltage > 6V<br><br>AND | 1 count/1 ms | Type A MIL Illumination. |
| MD_BRIDGE_OVER_TEMP_ERROR_FAULT | C05C2 | This monitor checks if:<br>• Excessive local temperature OR failures that cause incorrect detection of over temperature. | During run time Bridge Driver reports over temperature error (using SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register shutdown error "Overtemperature Shutdown" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1 ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD_BRIDGE_OSF_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports output stage feedback failure (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register for output stage feedback errors any error is set | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count /1ms | Type A MIL Illumination. |
| MD_BRIDGE_ECO_FAIL_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports ECC failure (using SPI error registers). | special event register of bridge driver indicates that error correction of control register failed<br><br>AND<br><br>the fault has occurred more than once in this ignition cycle. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_HS_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports high side capacitor overvoltage error (using ERR line and SPI error registers). | • Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit<br><br>• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Overvoltage Detection Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_HS_UNDER_VOLTAGE_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports high side capacitor under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BDHBCUUVDETECTTHRESHOLD. | • Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit<br><br>• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Undervoltage Detection Error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_NOT_DISABLED_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver enable signal connectivity. | The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is inactive, motor FETs can not be driven. | Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) inactive and set all three bottom FETs ON.<br>After 100us all bottom FETS were not disabled. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 39 ms | Type A MIL Illumination. |
| MD_BRIDGE_SOFF_NOT_DISABLED_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver SOFF signal connectivity. | The microprocessor shall test that when SOFF pin is inactive, motor FETs can not be driven. | Set bridge driver HW SOFF Pin inactive and set all three bottom FETs ON.<br>After 100us all bottom FETS were not disabled. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 40 ms | Type A MIL Illumination. |
| MD_BRIDGE_SOFF_NOT_ENABLED_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver SOFF signal connectivity. | The microprocessor shall test that whenSOFF pin is active motor FETs can be driven. | Set bridge driver HW SOFF Pin active with all three bottom FETS already ON.<br>After 100us even one bottom FET was not enabled. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 30 msec | Type A MIL Illumination. |
| MD_BRIDGE_LATENT_WARNING_EVENT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | The BD has reported a latent fault' (over SPI) | In SPI status "SPI special event" is set<br><br>AND | • ECU provides assist<br>AND<br>• No safe state on bridge driver | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_NOT_ENABLED_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver enable signal connectivity. | The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is active motor FETs can be driven. | Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) active with all three bottom FETS already ON.<br>After 100us even one bottom FET was not enabled. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 29 msec | Type A MIL Illumination. |
| MD_BRIDGE_CP_OVER_VOLTAGE_FAULT | C057F | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports charge pump overvoltage error (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register external error "charge pump overvoltage detection error" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CP1_OVERLOAD_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports CP1 overload error (using ERR line and SPI error registers). | special event register of bridge driver indicates that error correction of control register failed<br><br>AND<br><br>(In register internal errors "Charge Pump1 Overload Error" is set<br><br>OR<br><br>In register shutdown errors "Vs Path Charge Pump Input Overload" is set). | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_CP2_OVERLOAD_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports CP2 overload error (using ERR line and SPI error registers). | special event register of bridge driver indicates that error correction of control register failed<br><br>AND<br><br>(In register internal errors "Charge Pump2 Overload Error" is set | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MDBRIDGEDDPFAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | During run time Bridge Driver reports digital driving path failure (using ERR line and SPI error registers). | bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>In register shutdown error "Digital Driving Path Stucked Shutdown" is set. | • ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 1 count/1ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_BIST_CB_UV_FAULT | C0580 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Perform Bridge driver charge pump buffer (CB) under voltage self test. | When Bridge Driver was put into CB under voltage self test mode and after 5msec, bridge driver error output pin was not active<br>(IOHWAB_BRIDGE_1_ERROR) | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 85 ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_BIST_CSA_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Perform Bridge driver amplifier gain BIST. | When Bridge Driver was put into CSA Gain self test mode,<br><br>bridge driver error output pin is not active (IOHWAB_BRIDGE_1_ERROR)<br><br>OR<br><br>Isense reading was not within limits. | Battery voltage between 7.1v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 100 ms | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MD BRIDGE DRV BIST CSA VRO FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Perform Bridge driver CSA VRO BIST. | When Bridge Driver was put into CSA VRO self test and self test was finished, one of the CSA 11213 supply over voltage/under voltage error bit was not set. | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 170 ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_BIST_SHORT_CCT_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver short circuit detection not working. | Bridge driver built in high/low side short circuit detection test. | When Bridge Driver was put into short circuit test mode and FET was driven,<br><br>bridge driver error output pin was not active<br>(I0HW AB_B RIDGE_1_ERROR)<br><br>OR<br><br>Short circuit error bits were not set in register<br><br>OR<br><br>1-li rth-ci ria 'I/O/'} Orain Qmirr'O Maoci iramanf urara nnt at avnarfad wahia | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 180 ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_BIST_TIMEOUT_FAULT | C0582 | This monitor checks if:<br>•Bridge Driver BIST networking correctly. | Built-in selftest timeout. | Bridge Driver built in selftest was not completed within 100msec. | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 1 count/1ms | Type A MIL Illumination. |
| MD BRIDGE DRV BIST VCC FAULT | C0582 | This monitor checks if:<br>• Bridge Driver incorrect operation. | Perform Bridge Driver's VCC built in selftest. | When Bridge Driver was put into VCC self test mode,<br><br>bridge driver error output pin was not active<br>(I0HW AB_B RIDGE_1_ERROR)<br><br>OR<br><br>VCC under voltage error bit was not set in external error register | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2 counts/ 50ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_INHI BIT_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver inhibit signal connectivity<br>• Bridge Driver incorrect operation. | Verify Bridge Driver will be in SLEEP mode, if Bridge driver is inhibited. | When HW inhibit Pin (IOHWAB_BRIDGE_1-INHIBIT) is active, thebridge driver operation mode register did not indicate that it is in the expected Sleep Mode. | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2counts/2ms | Type A MIL Illumination. |
| MD_BRIDGE_DRV_WAKE_UP_FAULT | C0582 | This monitor checks if:<br>• Bridge Driver inhibit signal connectivity<br>• Bridge Driver incorrect operation. | Remove Bridge inhibit and verify SPI comms is started and Bridge Driver state changes to IDLE. | When HW inhibit Pin (IOHWAB_BRIDGE_1-INHIBIT) is driven inactive, the bridge driver operation mode register did not transit from Sleed Mode to the expected Idle Mode. | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2counts/2ms | Type A MIL Illumination. |
| MD_BRIDGE_SHORT_CIRCUIT_FAULT | CO58 2 | This monitor checks if:<br>• Bridge Driver incorrect operation. | This failsafe checks the SPI communication from the bridge driver to see if it is reporting a short circuit fault. This failsafe operates at run-time | bridge driver error output pinis active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set<br><br>AND<br><br>Inregister Short Circuit Errors any of the "Short Circuit at High/Low-side 1 or 2 or 3" are set. | •ECU provides assist<br>AND<br>• No safe state on bridge driver<br><br>Note:<br>ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring. | 3 msec | Type A MIL Illumination. |
| MOTOR-DE MAG_WARN | C05C2 | This monitor checks if:<br>Motor magnet over temperature. | Motor magnet temperature is greater than threshold. | Sets when the estimated motor magnet temperature is > 140°C | Power ON, Continuous Failsafing | 5 msec | Type A MIL Illumination. |
| MOTOR_DEMAG_FAIL | C05C2 | This monitor checks if:<br>Motor magnet over temperature. | Motor magent temperature is greater than threshold. | Sets when the estimated motor magnet temperature is > 160°C | Power ON, Continuous Failsafing | 20 msec | Type A MIL Illumination. |
| MOTOR_OVER_TEM P_WARN | C05C2 | This monitor checks if:<br>Motor winding over temperature. | Motor winding temperature is greater than threshold. | Sets when the estimated motor winding temperature is > 190°C | Power ON, Continuous Failsafing | 20 msec | Type A MIL Illumination. |
| MOTO R_OVER_TEMP_F AIL | C05C2 | This monitor checks if:<br>Motor winding over temperature. | Motor winding temperature is greater than threshold. | Sets when the estimated motor winding temperature is > 220°C | Power ON, Continuous Failsafing | 20 msec | Type A MIL Illumination. |
| MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT | C0580 | This monitor checks if:<br>o Bridge driver disabled<br>o Bridge driver in safe off mode<br><->Rrirlna Hrh/ar mo lfi inntirtninri | ■Driven phase is detected as not low when it should be driven low. | ■Driven phase voltage > 1.2V when < 1.2V expected | Battery voltage between 7.1 v and 18v<br>AND<br>Motor rotating below +/-8.3mrev/s | 2 msec | Type A MIL Illumination. |
| MD_PU_BRIDGE_PIR_CLOSE1_OPEN_CCT_FAULT | C0580 | This monitor checks if:<br>o Open motor phase<br>-Due to connector signals open<br>_nti io trx nrvw iA/i+Kin lZ 11 mr>fr\r z'irz'iiif | Non-driven phase voltages not pulled low while FETsare driven closed. | • phase voltage > 1.2V when < 1.2V expected | ■If MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT detects, this fault will not detect. | 2 msec | Type A MIL Illumination. |
| SCP1_CORRELATION_ERROR | C0574 | This monitor checks if:<br>SCP1 signal failure | The SCP1 ,SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal.<br>This fault is set if the difference exceeds the error threshold value. | \|SCP_1 - SCP_2\| > 5 Bar | Input signals valid for some time (allow system/signal to initialize) | 125-500 ms<br>18000 Counts | Type A MIL Illumination. |
| SCP2_CORRELATION_ERROR | C0574 | This monitor checks if:<br>SCP2 signal failure | The SCP1 ,SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal.<br>This fault is set if the difference exceeds the error threshold value. | \|SCP_1 - SCP_2\| > 5 Bar | Input signals valid for some time (allow system/signal to initialize) | 125-500 ms<br>18000 Counts | Type A MIL Illumination. |
| SCP1_OFFSET_ERROR | C0574 | This monitor checks if:<br>SCP1 signal failure | The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit. | \|SCP_1_0ff] >10Bar | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake, | 100 ms<br>Goal: 18000 | Type A MIL Illumination. |
| SCP2_OFFSET_ERROR | C0574 | This monitor checks if:<br>SCP2 signal failure | The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit. | \|SCP_2_Off] >10Bar | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake, | 100 ms<br>Goal: 18000 | Type A MIL Illumination. |
| BP_MODEL_TOO_H IGH_ERROR | C053D | This monitor checks if:<br>Common cause Boost Pressure Sensor failure (in-range high) | The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates higher pressure than predicted by the model and than evidenced by the vehicle deceleration. | •Valid braking request (driver or autonomous)<br>• BP_Model (MPS)< Boost pressure - 50 Bar<br>• Vehicle deceleration is not observed | • Signal valid;<br>• No ABS;<br>• vehicle at speed and is slowing down.<br>•driver noton throttle and requested enough pressure | 500 ms<br>Goal: 18000 | Type A MIL Illumination. |
| BP_MODEL_TOO_LOW_ERROR | C053D | This monitor checks if:<br>Common cause Boost_P failure (in-range-low) | The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates lower pressure than predicted by the model and than evidenced by the vehicle deceleration. | •Valid braking request (driver or autonomous)<br>• BP_Model (MPS) > Boost pressure + 5 Bar<br>• Vehicle deceleration is observed | • Signal valid;<br>• No ABS;<br>• DAP close to end position;<br>• vehicle at speed not slowing down much;<br>•driver noton throttle and requested enough pressure | 500 ms<br>Goal: 18000 | Type A MIL Illumination. |
| BP1_CORRELATION_ERROR | C053D | This monitor checks if:<br>BP1 signal failure | The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal | \|Boost_P_1 - Boost_P_2\| > 5 Bar | Input signals valid for some time (allow system/signal to initialize) | 125-500 ms<br>18000 Counts | Type A MIL Illumination. |
| BP2_CORRELATION_ERROR | C053D | This monitor checks if:<br>BP2 signal failure | The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal | \|Boost_P_1 - Boost_P_2\| > 5 Bar | Input signals valid for some time (allow system/signal to initialize) | 125-500 ms<br>18000 Counts | Type A MIL Illumination. |
| B P_RAW—O F FSET-ERROR | C053D | This monitor checks if:<br>Boost Pressure Sensor Failure | The offset required to zero the Boost Pressure sensor is larger than the specification limit of 50 bar. | \|BP_RAW_Off\| > 50 BAR | • Input signal valid;<br>•Driver request, DAP position, suggest there should be no pressure;<br>• \/ahir'la orralarotinn v/ohir'la at cnaad | 500 ms<br>Goal: 18000 | Type A MIL Illumination. |
| BP1OFFSETERROR | C053D | This monitor checks if:<br>BP1 signal failure | The offset required to zero the Boost Pressure sensor is larger than the specification limit | \|B00ST_P_1_0ff\| > 10 Bar | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake. | 100 ms<br>Goal: 18000 | Type A MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| BP2_OFFSET_ERROR | C053D | This monitor checks if:<br>BP2 signal failure | The offset required to zero the Boost Pressure sensor is larger than the specification limit | IBOOST P 2 Offl > 10 Bar | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake. | 100 ms<br>Goal: 18000 | Type A. MIL Illumination. |
| MCPRESSENERRATIC | C053D | This monitor checks if:<br>• Intermittent failure of the pressure sensor.<br>• Intermittent open or short in the internal circuitry of the printed circuit board. | • Pressure Sensor Erratic<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | Ohmic Status Faulted = Sensor open or shorted to sensor supply (conditions for MC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for MC_PRES_SEN_SHORTED_LOW)<br>Fault counts toward setting each time Ohmic Faulted status changes from Passed to Faulted or from Faulted to Passed. | • Sensor voltage supply in range<br>• Boost Pressure Sensor is enabled | 80 ms<br>Goal: 800 | Type A. MIL Illumination. |
| MC PRES SEN SHORTED LOW | C053E | This monitor checks if:<br>• Defective pressure sensor.<br>• Defective pressure sensor connector.<br>• Defective printed circuit board.<br>• Defective microprocessor feedback input port. | • Pressure Sensor Shorted Low<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | principal sensor voltage < 4.61% of principle sensor supply voltage<br>OR<br>reference sensor voltage < 4.85% of reference sensor supply voltage | • Sensor voltage supply in range<br>• Boost Pressure Sensor is enabled | 100 ms | Type A. MIL Illumination. |
| MC_PRES_SEN_OPEN_ORSHRTHIGH | C053F | This monitor checks if:<br>• Defective pressure sensor.<br>• Defective pressure sensor connector.<br>• Defective printed circuit board.<br>• Defective microprocessor feedback input port. | • Pressure Sensor Open or Shorted High<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | principal sensor voltage > 95.24% of principle sensor supply voltage<br>OR<br>reference sensor voltage > 94.50% of reference sensor supply voltage | • Sensor voltage supply in range<br>• Boost Pressure Sensor is enabled | 100 ms | Type A. MIL Illumination. |
| SCPRESSENSHORTEDLOW | C0571 | This monitor checks if:<br>• Defective pressure sensor.<br>• Defective pressure sensor connector.<br>• Defective printed circuit board.<br>Defective microprocessor feedback input port. | • Pressure Sensor Shorted Low<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | principal sensor voltage < 4.61% of principle sensor supply voltage<br>OR<br>reference sensor voltage < 4.85% of reference sensor supply voltage | • Sensor voltage supply in range<br>• Secondary Circuit Pressure Sensor is enabled | 100 ms | Type A. MIL Illumination. |
| SC_PRES_SEN_OPEN_OR_SHRT_HIGH | C0572 | This monitor checks if:<br>• Defective pressure sensor.<br>• Defective pressure sensor connector.<br>• Defective printed circuit board.<br>Defective microprocessor feedback input port. | • Pressure Sensor Open or Shorted High<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | principal sensor voltage > 95.24% of principle sensor supply voltage<br>OR<br>reference sensor voltage > 94.50% of reference sensor supply voltage | • Sensor voltage supply in range<br>• Secondary Circuit Pressure Sensor is enabled | 100 ms | Type A. MIL Illumination. |
| SC_PRES_SEN_ERRATIC | C0574 | This monitor checks if:<br>• Intermittent failure of the pressure sensor.<br>• Intermittent open or short in the internal circuitry of the printed circuit board. | • Pressure Sensor Erratic<br>• This diagnostic checks both raw Boost Pressure principle and reference signals. | Ohmic Status Faulted = Sensor open or shorted to sensor supply (conditions for SC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for SC_PRES_SEN_SHORTED_LOW)<br>Fault counts toward setting each time Ohmic Faulted status changes from Passed to Faulted or from Faulted to Passed. | • Sensor voltage supply in range<br>• Secondary Circuit Pressure Sensor is enabled | 80 ms<br>Goal: 800 | Type A. MIL Illumination. |
| PRESSURE_SENSOR_MISSING_CALIBRATION | C0560 | This monitor checks if:<br>• Missing Calibration<br>• NVRAM error | This fault only checks if the EOL calibration is sucessful or not. If the calibration was not yet done or if the calibration is not successful, then this fault is set. The NVRAM contains both calibrated offset and status, but only the status is checked to set the fault. | status != SUCCESSFUL | Anytime after system wake up and read NVRAM | 500 ms<br>Goal:18000 | Type A. MIL Illumination. |
| SWA_GAIN_ERROR | C0051 | This monitor checks if:<br>• Defective steering angle sensor.<br>• Defective cable.<br>• Defective printed circuit board.<br>• Defective microprocessor feedback input port. | • Steering Wheel Angle Sensor - Gain Error<br>• The monitoring recognizes offset faults as well as amplification fault. | Tight Check:<br>Difference between zeroed measured SWA signal and estimated SWA signal > Tight Check threshold<br>Tight check threshold is based on a function of vehicle speed, Ay and Yaw Rate with minimum threshold of 50 deg.<br>Loose Check:<br>Difference between zeroed SWA signal and estimated SWA signal > Loose Check threshold<br>Loose check threshold is based on a function of vehicle speed, Ay and YawRatp with minimum thrpshnld nf 100 dpci | 1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid<br>2. MCPis initialized<br>3. Vehicle speed > 4.0 m/s while driving forward<br>4. Emissions Rolls Test Inactive<br>Tight Check:<br>1. Driving is stable<br>Loose Check:<br>1. Driving is marginally stable | If SWA gain error= 2*threshold<br>Goal: 900 ms<br>else<br>Goal: 1.8 s | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWA_OFFSET_ERROR | C0051 | This monitor checks if:<br>• electronic or mechanical fault in sensor<br>• mechanical attachment of the sensor<br>• incorrect wheel geometry | • Steering Angle Sensor - Offset Error<br>• The SWA signal shows an offset out of specification. | Before Initialization:<br>High offset:<br>ILearned offset-Stored End of line offset from NVRAM\| > 23°<br>Low offset:<br>ILearned offset-Stored End of line offset from NVRAM\| > 18°<br>After Initialization:<br>ILearned offset-Stored End of line offset from NVRAM\| > 18° | 1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid<br>2. MCPis initialized<br>3. Vehicle speed > 4.0 m/s while driving forward<br>4. Emissions Rolls Test Inactive<br>Tight Check:<br>1. Driving is stable<br>Loose Check:<br>1. Driving is marginally stable | Before initialization:<br>High offset: 100 ms<br>Low offset: 1.8 s<br>After Initialization:<br>100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWA_RAW_OFFSETERROR | C0051 | This monitor checks if:<br>• electronic or mechanical fault in sensor<br>• mechanical attachment of the sensor<br>• incorrect wheel geometry | • Steering Wheel Angle Sensor - Raw Offset<br>• The SWA signal has to show an implausible high value before the initialization. | Difference between measured SWA and estimated SWA > 175°<br>ABS( ABS(Yaw_Rate.Conv_To_Swa_s16) - ABS(Swa.Turn_Corrected_Delayed_s16)) > SWA_RAW_OFFSET_ERROR_THR_S16<br>SWA_RAW_OFFSET_ERROR_THR_S16= 175 deg | 1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid<br>2. MCPis initialized<br>3. Vehicle speed > 4.0 m/s while driving forward<br>4. Emissions Rolls Test Inactive<br>Tight Check:<br>1. Driving is stable<br>Loose Check:<br>4 I~ltlvl/Milo rv-l<xl/-iiodll/r+nk1 | 200 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWA_MAX_VALUE_ERROR | C0051 | This monitor checks if:<br>• electronic or mechanical fault in sensor<br>• mechanical attachment of the sensor<br>• Incorrect wheel geometry | • Steering Angle Sensor- Max Value Error<br>• The SWA signal shows a greater value than physically possible in the vehicle. | Absolute SWA sensor: \|Swa Turn Correctedl > 720°<br>OR<br>Relative SWA sensor: \|SwaTurn Correctedl > 1440° before initialization<br>OR<br>Relative SWA sensor: \|Swa zeroed\| > 720° after initialization | 1. SWA is valid and calibrated<br>2. Emissions Rolls Test Inactive | 200 ms<br>OR<br>200 ms before initialization<br>OR<br>200 ms after initialization | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWA_NOT_ALIVE_ERROR | C0051 | This monitor checks if:<br>• electronic or mechanical fault in sensor hardware | • Steering Wheel Angle - Not Alive Error,Also known as "Constant Value Fault"<br>• The SWA signal does not change while the Yaw Rate changes: | \|Yaw rate derivative\| > 57 s$^{-2}$ | 1. Yaw rate and SWA valid<br>2. Emissions Rolls Test Inactive<br>3. Wheel speed information valid<br>4. Vehicle speed > 2.5 m/s<br>5. Difference between wheel speeds front and rear ? 5 m/sec<br>6. Difference between measured and estimated Yaw rate < 67 s<br>7. Yaw Rate has to be > 37 s once and < -37 s once | 3s | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SWA STEP ERROR | C0051 | This monitor checks if:<br>• electronic or mechanical fault in sensor hardware | •Steering Wheel Angle Sensor - Step Error<br>•The SWA signal has to show a gradient above a certain threshold. | Raw SWA signal change > 30007s<br>Set previous signal for next cycle. | 1. SWA is valid<br>2. Emissions Rolls Test Inactive | 50 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT_SENSOR_NOT_ALIVE_ERROR | C0061 | This monitor checks if:<br>• electronic fault in sensor | • Lat Acceleration Sensor - Not Alive Fault<br>• The Lat Acc signal does not change or is locked at a rail value.<br>•This failure is set if the lateral acceleration sensor is not able to change its value anymore or if it is outside the specified max range. | 1. lat acc signal ?+/-25m/s $^2$<br>OR<br>2. Lat Acc is constant<br>lat acc signal < +/- 14 m/s $^2$<br>AND<br>Vehicle Speed > 3 m/s $^2$ | Emissions Rolls Test Inactive<br>AND<br>1. Lat Acc is valid<br>Wheel speed is valid<br>vehicle speed > 3 m/s $^2$ | 1. 1 s<br>2. 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT SENSOR STEP ERROR | C0061 | This monitor checks if:<br>• electronic fault in sensor<br>• mechanical mounting of sensor | • Lat Acceleration Sensor - Step Error<br>• The Lat Acc signal has to show a gradient above a certain threshold. | Raw Lat Acc signal change is > 800 m/s $^3$ | Lat accel is valid<br>ABS is not active | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT_SENSOR_RAW_OFFSET_ERRO R | C0061 | This monitor checks if:<br>• Sensor Open<br>• Open circuit in ECU in series with sensor input | • Lat Acceleration Sensor - Raw Offset Error<br>•The Lat Acc signal has to show an implausible high value while standing still. | Lat Acc signal >6.5m/sec $^2$ | • Lat Acc is valid<br>• Wheel speed info is valid<br>• Vehicle is standing still | 200 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LATSEN SOROFF SET ERROR | C0061 | This monitor checks if:<br>• Sensor Open<br>• Open circuit in ECU in series with sensor input | • Lat Acceleration Sensor - Offset Error<br>•The Lat Acc signal shows an offset out of specification. | Before Initialization:<br>1. 1 Continuously learned offset is > 4 m/sec $^2$<br>OR<br>2. 2 Continuously learned offsets > 1.8 m/sec $^2$ for 4 sec<br>WHILE<br>vehicle speed > 13.8 m/s<br>OR driving distance > 150m before initialization<br>OR<br>3. 3 Continuously learned offsets > 3 m/s $^2$ for 4 sec<br>WHILE<br>vehicle speed <13.8 m/sec<br>AND driving distance < 150 m before initialization<br>After Initialization:<br>4. 8 "extended learn" offsets are >1.8 m/s $^2$<br>(Extended learn offsets are determined while vehicle driving straight over accumulated distances on the order of 250m) | • Lat Acc valid<br>• Yaw Rate, wheel speed information and steering angle are valid<br>• Vehicle speed > 4.2 m/sec<br>• Stable forward driving | 1. 100 ms<br>2. 1.8 s<br>3. 1.8s<br>4. 100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT_SEN SOR_GAI N_ERRO R | C0061 | This monitor checks if:<br>• electronic fault in sensor | • Lat Acceleration Sensor - Gain Error<br>•This function computes the difference between the measured ay signal and an ay estimate, based on a vehicle model. If the difference between the two is above a threshold for a certain period of time, a sensor fault is set. | 1. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > failure threshold<br>OR<br>2. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > two times the failure threshold<br>The fault basic threshold is based on the initialization state:<br>Before Initialization:<br>4 m/sec $^2$ + delta<br>After Initialization:<br>2 m/sec $^2$ + delta<br>Where delta is based on the driving situation, a function of vehicle speed, Yaw Rate, or steering angle.<br>The model based on steering angle is considered to be the most robust one. | • No active Lat Accel fault<br>• ay-signal is valid<br>• Yaw Rate signal is valid<br>• No active Wss faults<br>• Vehicle-speed > 4.2 m/sec, while driving forward | 1. 1.5s<br>2. .75 s | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LONG_SE NSOR_NOT_A LIVE_ER ROR | C0551 | This monitor checks if:<br>• electronic fault in sensor | • Longitudinal Sensor - Constant Error<br>• The Long Acc signal does not change or is locked at a rail value. | 1.<br>long acc signal >= +/- 25 m/s $^2$<br>OR<br>2.<br>Long Acc is constant<br>AND<br>long acc signal < +/- 14 m/s $^2$<br>AND<br>Vehicle Speed > 3 m/s $^2$ | • Emissions Rolls Test Inactive<br>AND<br>• Long Acc is valid<br>• Wheel speed is valid<br>•vehicle speed > 3 m/sec | 1. 1 s<br>2. 100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LONG_SENSOR_STEP_ERROR | C0551 | This monitor checks if:<br>• electronic fault in sensor<br>• mechanical mounting of sensor | • Long Acceleration Sensor - Step Error<br>• The Long Acceleration signal has to show a gradient above a certain threshold. | Raw Long Acc signal change is > 800 m/s $^3$ | • Long Acc is valid<br>• ABS not active<br>• Emissions Rolls Test Inactive | 100 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LONG_SENSOR_RAW_OFFSETERROR | C0551 | This monitor checks if:<br>• electronic fault in sensor<br>• mechanical mounting of the sensor | • Long Acceleration Sensor - Raw Offset Error<br>• The Long Acc signal has to show an implausible high value while standing still. | Long Acc signal > 8 m/s $^2$ | • Long Acc is valid<br>• Wheel speed info is valid<br>• Vehicle is standing still<br>• Emissions Rolls Test Inactive | 200 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LONG_SENSOR_OFFSET_ERROR | C0551 | This monitor checks if:<br>• electronic fault in sensor<br>• mechanical mounting of sensor | • Long Acceleration Sensor - Offset Error<br>•The Long Acc signal shows an offset out of specification. | 3 continuously learned offsets are > 2.5 m/s $^2$ | • Long Acc is valid<br>• Wheel speed information is valid<br>• All four wheel speeds > 3 m/s<br>• stable forward driving<br>• No vehicle control activities such as ABS, TC, and VSC<br>• Emissions Rolls Test Inactive | 1. 100 ms<br>2. 1.8 s<br>3. 1.8 s<br>4. 10 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LONG_SENSOR_GAIN_ERROR | C0551 | This monitor checks if:<br>• electronic fault in sensor | • Long Acceleration Sensor - Gain Error<br>•This monitoring recognizes offset faults as well as amplification faults. | Change in estimated Long Acc >0.2 m/s $^2$<br>AND<br>Measured Long Acc-Estimated Long Acc >0.8 m/s $^2$ | • Long Acc and wheel speed information are valid<br>• All four wheel speeds > 3 m/s<br>• Stable forward driving<br>• Accelerator position gradient < 600%/sec<br>• Emissions Rolls Test Inactive | 200 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| YAW_SENSOR_NOT_ALIVE_ERROR | C0063 | This monitor checks if:<br>• electronic fault in sensor | • Yaw Rate Sensor - Not Alive Error<br>• The Yaw Rate signal does not change or is locked at a rail value. | 1. Yaw rate is constant<br>AND<br>\|Yaw rate\| < 857s<br>AND<br>Vehicle Speed > 3 m/s $^2$<br>2. \|Yaw rate\| ? 1307s | • Emissions Rolls Test Inactive<br>AND<br>1. Yaw Rate is valid<br>Wheel speed info is valid<br>Vehicle speed > 3 m/s | 1. 1 s<br>2. 100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| YAW SENSOR STEP ERROR | C0063 | This monitor checks if:<br>• defective sensor<br>• mechanical mounting of the sensor<br>• Stone impingement at the floor pan | • Yaw Rate Sensor - Step Error<br><br>• The Yaw Rate signal has to show a gradient above a certain threshold. | Yaw rate gradient > 8007s² | • Yaw Rate is valid<br>• Emissions Rolls Test Inactive | 100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| YAW_SENSOR_RAW_OFFSET ERROR | C0063 | This monitor checks if:<br>• electronic sensor fault | • Yaw Rate Sensor Raw Offset Error<br><br>• The Yaw Rate signal has to show an implausible high value while standing still. | Low error threshold: If initialization info is valid and below threshold<br><br>\|Yaw rate\| > 507s | • Yaw Rate is valid<br>• Wheel speed info is valid<br>• Vehicle is standing still<br>• Emissions Rolls Test Inactive | 200 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| YAW SENSOR OFFSET ERROR | C0063 | This monitor checks if:<br>• electronic sensor fault | • Yaw Rate Sensor - Offset Error<br><br>• The Yaw Rate signal shows an offset out of specification. | While Standing Still<br><br>1 Continously learned offset > 5 deg/sec while vehicle standing still. (Offset must remain present as vehicle driven away following statndstill condition) | • Yaw Rate is valid<br>• Steering angle, Lat Acc and wheel speed informaiton are valid<br>• Vehicle speed > 4.2 m/s<br>• Stable forward driving<br>• Emissions Rolls Test Inactive | 1. 100 ms<br>2. 1.8 s<br>3. 100 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| YAW_SENSOR_GAIN-ERROR | C0063 | This monitor checks if:<br>• electronic fault in sensor | • Yaw Rate Sensor - Gain Error<br><br>• This monitoring recognizes offset faults as well as amplification faults. | 1. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > failure threshold<br><br>OR<br><br>2. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > two times the failure threshold<br><br>The fault basic threshold is based on the initialization state:<br><br>Before Initialization:<br>67 s+ delta<br><br>After Initialization:<br>37 s+ delta<br><br>Where delta is based on the driving situation, a function of vehicle speed, Ay, steering angle and steering angle derivative. | • Yaw Rate is valid<br>• Steering angle, Lat Acc and wheel speed information are valid<br>• Vehicle speed > 2.5 m/s driving forward<br>• Emissions Rolls Test Inactive | 1. 1 s<br><br>2. 500 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PTS_TO_SCP_MODEL_TOO_HIGH_ERROR | C05D2 | This monitor checks if:<br>• Master cylinder seal leakage to reservoir<br>• Pedal Simulator seal leakage to reservoir<br>• In-range failure of SCP sensor | The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_HIGH_ERROR detects the situation where the modeled pressure is much higher than the measured pressure.<br><br>Given certain travel, some amount of minimun pressure is expected in the SC. Otherwise something is wrong. | BHS modeled pressure > SCP Measured Pressure + 20 Bar<br><br>Look up table (add lookup table to appendices) | PTS > the minimum point on the lookup table | 500 ms<br>Goal: 18000 Counts | Type A. MIL Illumination. |
| PTS_TO_SCP_MODEL_TOO_LOW_ERROR | C05D3 | This monitor checks if:<br>• Pedal Simulator Valve is closed or blocked<br>• Pedal Simulator seized/fails to store fluid<br>• In-range failure of SCP sensor | The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_LOW_ERROR detects the situation where the modeled pressure is much lower than the measured pressure. | BHS modeled pressure < SCP Measured Pressure - 20 Bar | The brake event is not a fast apply (which may cause unpredictable high pressure) | 500 ms<br>18000 Counts | Type A. MIL Illumination. |
| PTS1_OUT_OF_RANGE_ERROR | C05CC | This monitor checks if:<br>• Failure of PTS1<br>• Failure of travel sensor cursor rod | During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error. | • PTS1 signal > 38 mm AND<br>• PTS2 signal and SCP signal agree that actual travel is in range<br><br>Not checking for SCP | Signal is valid | 5 s<br>18000 Counts | Type A. MIL Illumination. |
| PTS2_OUT_OF_RANGEERROR | C05CF | This monitor checks if:<br>• Failure of PTS2<br>• Failure of travel sensor cursor rod | During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error. | • PTS2 signal > 38 mm AND<br>• PTS1 signal and SCP signal agree that actual travel is in range<br><br>Not checking for SCP | Signal is valid | 5 s<br>18000 Counts | Type A. MIL Illumination. |
| PTS1_STEP_ERROR | C05CC | This monitor checks if:<br>• Failure of PTS1 signal line | The PTS1 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS2 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS2 model and SCP signals agree on driver braking level, PTS1 model and SCP disagree) | • PTS1 signal gradient > 700 mm/s<br>• \|PTS1 - PTS2\| > Error_threshold<br>• Model(PTS1) <> SCP and Model(PTS2) == SCP | Signal is valid | 50 ms<br>Goal: 10 Counts | Type A. MIL Illumination. |
| PTS2_STEP_ERROR | C05CF | This monitor checks if:<br>• Failure of PTS2 signal line | The PTS2 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS1 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS1 model and SCP signals agree on driver braking level, PTS2 model and SCP disagree) | • PTS2 signal gradient > 700 mm/s<br>• \|PTS1 - PTS2\| > Error_threshold<br>• Model(PTS2)<> SCP and Model(PTS1) == SCP | Signal is valid | 50 ms<br>Goal: 10 Counts | Type A. MIL Illumination. |
| PTS1_SENT_RECEIVE_ERROR | C2A13 | This monitor checks if:<br>PTS1 SENT data error | The PTS2 SENT message is comprised of a 12 bit data value (pedal travel), a 12 bit data value (motor position), a 4 bit CRC, and a 4 bit status field. | PTS1 data < Lower_Threshold OR<br>PTS1 data > Upper_Threshold OR<br>PTS1 upper nibbles + PTS1 lower nibbles != 4095 | Any of the following conditions:<br>• SENT message Checksum error<br>• SENT status field indicates receive failure<br>• Received pedal travel is out-of-range low (0)<br>• Received pedal travel is out-of-range high (4095) | 5ms | Type A. MIL Illumination. |
| PTS2_SENT_RECEIVE_ERROR | C2A14 | This monitor checks if:<br>PTS2 SENT data error | The PTS1 SENT message is comprised of a 12 bit data value, its 12 bit complement, a 4 bit CRC, and a 4 bit status field | PTS2 data < Lower_Threshold OR<br>PTS2 data > Upper_Threshold | Any of the following conditions:<br>• SENT message Checksum error<br>• SENT status field indicates receive failure<br>• Rolls Useba ooff ire Emissions do not [illegible] | 5ms | Type A. MIL Illumination. |
| PTS1_SENT_MESSAGE_MISSING | C2A13 | This monitor checks if:<br>Signal line is open or shorted to GND.<br>Shorted to supply<br>Wiring | The SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION-VALUE. | N/A | N/A | 5 msec | Type A. MIL Illumination. |
| PTS2_MPS2_SENT_MESSAGE_MISSING | C2A14 | This monitor checks if:<br>Signal line is open or shorted to GND.<br>Shorted to supply<br>Wiring | the SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION-VALUE. | N/A | N/A | 5 msec | Type A. MIL Illumination. |
| PTS1_CORRELATION_ERROR | C05DO | This monitor checks if:<br>PTS1 Signal Failure | The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal | • \|PTS1 - PTS2\| > 2 mm AND<br>• \|PTS1 - BAS\| > 2 mm AND<br>• \|PTS2- BAS\| < 2 mm | Signal is valid | 125-500 ms<br>18000 Counts | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| PTS2 CORRELATION ERROR | C05DO | This monitor checks if:<br>PTS1 Signal Failure | The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal | • \|PTS1 -PTS2\| > 2 mm AND<br>• \|PTS1 - BAS\| > 2 mm AND<br>• \|PTS2- BAS\| < 2 mm | Signal is valid | 125-500 ms<br>18000 Counts | Type A. MIL Illumination. |
| PTS_MISSING_CALIBRATION_ERROR | C05D4 | This monitor checks if:<br>• Missing Calibration<br>• NVRAM error<br>• ECU/ACU mismatch | The PTS calibrations are stored in NVRAM and reused at the start of each drive cycle. This fault sets if the stored calibrations don't match the values reported by the PTS sensor. | None | After system start up and read from NVRAM | 30 msec | Type A. MIL Illumination. |
| PTS1_OFFSET_ERROR | C05CC | This monitor checks if:<br>• defective sensor<br>• mechanical mounting of the sensor | The offset required to zero the PTS sensor is larger than the specification limit. | \|PTS1 Offset\| > 2.5 mm | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake. | 100ms<br>Goal: 18000 | Type A. MIL Illumination. |
| PTS2_OFFSET_ERROR | C05CF | This monitor checks if:<br>• defective sensor<br>• mechanical mounting of the sensor | The offset required to zero the PTS sensor is larger than the specification limit. | \|PTS2 Offset\| > 2.5 mm | The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result.<br>To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake. | 100ms<br>Goal: 18000 | Type A. MIL Illumination. |
| MPS2_CORRELATION_ERROR | C058E | This monitor checks if:<br>• MPS2 Failure<br>• Note: MPS1 failure results in BOOSTED_BRAKE_SYSTEM_FAILURE for lack of motor rotation / pressure build | MPS1 is SPI based with a 50 usee update rate. MPS2 is SENT based with a 1 msec update rate. During motor rotation there is an expected difference in MPS1 and MPS2 based on the different time sampling rates (time lag on MPS2).<br><br>MPS1 and 2 moving different direction; or<br>MPS1 and 2 stopped at different relative postion than history | \|MPS1 - MPS2\| > 2 Degrees +<br>3 Degrees (motor speed offset)<br><br>MPS1 and 2 moving different direction; or<br>MPS1 and 2 stopped at different relative postion than history | Signal is valid | 100 ms<br>Goal: 18000 | Type A. MIL Illumination. |
| MPS2_SENT_RECEIVE_ERROR | C2A1A | This monitor checks if:<br>MPS2 Signal Failure | Monitor MPS2 sent data received from the SentSensor. | This failsafe detects when MPS2 sent data received from the SentSensor is out of the valid range. | MPS signal data is received. | 5 msec | Type A. MIL Illumination. |
| MPS_BIST_FAULT | C058A | This monitor checks if:<br>MPS Built-in-Self-Test failure | Testing of this module should include running BIST at various MPS angles.<br>The ECU performs an independent calculation parallel to internal MPU sensor BIST software. The fault will occur when the parallel calculations don't match. | The value calculated within the MPS does not equal the ECU calculated value. | BIST Inputs are not faulty. | 30 msec | Type A. MIL Illumination. |
| SYS_ASIC_VDBAT_RANGE_FAILURE | P0562 | This monitor checks if:<br>• VDBAT Voltage is outside the voltage range | • KL30_1 Supply voltage outside of the specified range<br>• If the ASIC A/D value for VDBat is outside the acceptable range (VDBat < 6V or VDBat >25V) continuously for 100ms then the fault is set. | 6V < KL30_1 Supply Voltage > 25V | •ASIC's VDBAT Voltage Result SPI field is outside the range of 6 and 25 volts for 100msec | 100ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SYS_ASIC_PDBAT_RANGE_FAILURE | P0562 | This monitor checks if:<br>• PDBAT Voltage is outside the voltage range | • KL30_2 Supply voltage outside of the specified range<br>• If the ASIC A/D value for PDBat is outside the acceptable range (PDBat < 6V or PDBat >23V) continuously for 100ms then the fault is set. | 6V < KL30_2 Supply Voltage > 23V | •ASIC's PDBAT Voltage Result SPI field is outside the range of 6 and 23 volts for 100msec | 100ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| KL30_1_OPEN_OR_SHRTED_TO_GND | U3006 | This monitor checks if:<br>• Fuse blown (Open)<br>• Short_to_Ground | A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B.<br><br>• If the feedback ratio is lower than the valid lower threshold ratio, then KL30_1_Open_or_Shrted_to_Gnd fault is set | • Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2)<br>• If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON<br>• Fault is set if ratio is less than -30%<br>• If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF,<br>• Fault is set if ratio is less than -10% | • Power ON, Continuous Failsafing | 75ms | Type B. MIL Illumination. |
| KL30_2_OPEN_OR_SHRTED_TO_GND | U3007 | This monitor checks if:<br>• Fuse blown (Open)<br>• Short_to_Ground | A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B.<br>• If this feedback ratio exceeds the valid upper threshold ratio, then KL30_2_Open_or_Shrted_to_Gnd fault is set.<br><br>Note: Although the SW to tries to detect Fuse Blown/Shorted to ground with both switches on, fuse blown fault will not be detected due to the nature of the circuit and shorted to ground also may not be detected due to the damage that may be caused by this condition. Do not test this condition. | • Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2)<br>• If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON,<br>• Fault is set if ratio is greater than 30%<br>• If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF,<br>• Fault is set if ratio is greater than 10% | • Power ON, Continuous Failsafing | 75ms | Type B. MIL Illumination. |
| SYSTEM_VOLTAGE_LOW | P0562 | This monitor checks if:<br>• Vehicle Battery Voltage Supply is providing low voltage levels.<br>• Defective cables.<br>• Defective printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 8.5V for more than 150 msec then the fault is set.<br>When the system voltage is continuously greater than 9.0V for more than 100 msec then the fault is cleared. | Filtered system voltage < 8.5V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 150 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SYSTEM_VOLTAGE_EXCESSIVE_LOW | P0562 | This monitor checks if:<br>• Vehicle Battery Voltage Supply is providing excessively low voltage level.<br>• Defective cable.<br>• Defected printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 7.0V for more than 150 msec then the fault is set. When the system voltage is continuously greater than 7.5V for more than 150 msec then the fault is allowed to be cleared if not ignition latched. | Filtered system voltage < 7.5V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 150 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SYSTEM_VOLTAGE_HIGH | P0563 | This monitor checks if:<br>• Voltage Supply is providing high voltage levels.<br>• Defective printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 16.8V for more than 100 msec then the fault is set.<br>When the system voltage is continuously less than 16.3V for more than 100 msec then the fault is cleared. | Filtered system voltage > 16.8 V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 100 ms | Type B. MIL Illumination. |
| SYSTEM_VOLTAGE_EXCESSIVE_HIGH | P0563 | This monitor checks if:<br>• Voltage Supply is providing excessively high voltage levels.<br>• Defective printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 18.8V for more than 15 msec then the fault is set.<br>When the system voltage is continuously less than 18.3V for more than 100 msec then the fault is cleared. | Filtered system voltage > 18.8V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 15 ms | Type B. MIL Illumination. |
| SYSTEM_VOLTAGE_ECU_SELFTESTHOLD | P0562 | This monitor checks if:<br>• Voltage Supply is providing excessively low or high voltage levels.<br>• Defective printed circuit board. | System Self Test will not start if either of the following conditions are present: Polaris is not initialized Unfiltered System Voltage is outside the Excessive range (< 7.0V or >18.8V) If the System Self Test is delayed continuously for more than 100 msec then the fault is set. | Polaris.Resync_Seq_Error = TRUE or Unfiltered system voltage < 7.0V or Unfiltered system voltage > 18.8V | • Polaris is not initialized yet • System Voltage is outside the Excessive range (<7.0 V or >18.8V) Have not finished self-test | 5 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| SYSTEM VOLTAGE ERRATIC | P0562 | This monitor checks if:<br>• Voltage Supply is toggling between non-operational voltages and/or normal operating voltages • Defective cables.<br>• Defective printed circuit board. | If the filtered System Voltage is above Excessive High Voltage threshold or below Low Voltage threshold, this fault counts toward failure and if the voltage is above Low Voltage and below Excessive High Voltage thresholds the fault counts toward passing. This fault is done this way to catch voltages jumping between non-operational voltages and/or normal operating voltages. | If (Filtered System Voltage > 18.8) \|\| (Filtered System Voltage < 8.5) fail_counter += 15 else fail_counter -= 5 If fail_counter >= 900 set fault | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 300ms minimum | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PRIMARYWAKEUPLINESTUCKLOW | P2534 | This monitor checks if:<br>HW ignition line failure | The MCU compares the state of the Primary Wakeup Line with the Ignition switch status CAN signal from the ECM.<br>If the Primary Wakeup Line is read as Low but Ignition switch status signal indicates RUN or CRANK for a continuous 3 sec then the fault is set.<br>This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set. | (State of Primary Wakeup line == Not Wake) && (CAN Signal == (CRANK II RUN)) | • Primary Wakeup COMMS Signal is Valid<br>(Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched) | 2s | Type B. MIL Illumination. |
| PRIMARY_WAKEUP_LINE_STUCK_HIGH | P2535 | This monitor checks if:<br>HW ignition line failure | The MCU compares the state of the Primary Wakeup Line with theIgnition switch status signal from the ECM.<br>If the Primary Wakeup Line is read as High but Ignition switch status signal indicates not Crank and not RUN for a continuous 3 sec then the fault is set<br>This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set. | (State of Primary Wakeup line == Wake) && (CAN Signal != (CRANK \|\| RUN)) | • Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched)<br>• AND<br>• Primary Wakeup Line is ON | 2s | Type B. MIL Illumination. |
| INTERNAL_5V_SUPPLY_VOLT_ERRATIC | P0606 | This monitor checks if:<br>• Defective internal 5 V supply circuit<br>• Defective printed circuit board<br>• Defective microprocessor feedback input port<br>• Defective Polaris ASIC feedback input port | If the filtered 5V supply toggles outside the allowed range but does not stay there long enough to mature the INTERNAL_5V_SUPPLY_VOLT_FAILURE then this fault is matured by an up/down counter on the condition | If the filtered System Voltage toggles as per the below range<br>Filtered system voltage ? 4.75V<br>Filtered system voltage ? 5.25 V | • Internal 5V supply is enabled<br>• AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 800 counts/80ms minimum | Type A. MIL Illumination. |
| ECU_SELF_TEST_TIMEOUT | P0562 | This monitor checks if:<br>Faulted ECU | If the ECU selftest does not complete in the alloted amount of time, then set this fault. This fault allows to properly inform the driver that the EBCM functionality is not available.<br><br>Note- Timeout fault is latched if system self-test doesn't finish within 2 seconds. This time Hnacn't ink!flirlo th<2> firna if tha hottari/ x/alfnnaic niit afranna | None | Runs duting startup | 5 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PWR_PTS_MPS_SUP1_RANGE_LOW | C05D1 | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set. | if PWR<4.85 for 100ms | • MPS1 sensor is enabled<br>• PTS1 sensor is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 100ms | Type A. MIL Illumination. |
| PWR_PTS_MPS_SUP1_RANGE_HIGH | C05D1 | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set. | if PWR>5.15Vfor 100ms | • MPS1 is enabled<br>• PTS1 is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 100ms | Type A. MIL Illumination. |
| PWR_PTS_MPS_SUP1_ERRATIC | C05D1 | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec).<br>If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1.<br>Once the fault goal is reached then the fault is set and is ignition latched. | if PWR<4.85 or >5.15V | • MPS1 is enabled<br>• PTS1 is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 80ms | Type A. MIL Illumination. |
| PWR_PTS_MPS_SUP2_RANGE_LOW | C05BB | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set. | if PWR<4.85 for 100ms | • MPS2 is enabled<br>• PTS2 is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 100ms | Type A. MIL Illumination. |
| PWR_PTS_MPS_SUP2_RANGE_HIGH | C05BB | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set. | if PWR>5.15Vfor 100ms | • MPS2 is enabled<br>• PTS2 is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 100ms | Type A. MIL Illumination. |
| PWR_PTS_MPS_SUP2_ERRATIC | C05BB | This monitor checks if:<br>• Defective motor position sensor<br>• Defective pedal travel sensor<br>• Defective printed circuit board | The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS).<br>The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec).<br>If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1.<br>Once the fault goal is reached then the fault is set and is ignition latched. | if PWR<4.85 or >5.15V | • MPS2 is enabled<br>• PTS2 is enabled<br>AND<br>• None of the following are taking place:<br>• System is initializing<br>• System is re-initializing<br>• Engine is being cranked<br>• When requested by Diagnostic commands System is shutting down | 80ms | Type A. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| PWR SW COIL SUP OPEN | C053B | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage < 90%of KL30 x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR SW COIL SUP SHORT | C053B | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is offthe downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is not less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage > 80%of KL30 x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR_SW_BB_COIL_SUP_OPEN | C053B | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage < 90%of KL30-X | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR S W_BB_COIL_SUP_SHORT | C053B | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is offthe downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is not less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage > 80%of KL30_x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR S W_MOT_SUP_OPEN | C0595 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage < 80%of KL30_x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR_SW_MOT_SUP_SHORT | C0595 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 supply inputs are switched on/offbythe two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays.<br>When the Safety Relay is offthe downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is not less than 80% of KL30JNT for a continuous 50 msec then the fault is set. | If Feedback Voltage > 90.75%of KL30_x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR_SW_PSSW1_SUP_OPEN | U3006 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | This fault is not enabled is a Watchdog fault is already set.<br>The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits.<br>When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set | If Feedback Voltage < 50%of KL30_x | • Power ON, Continuous Failsafing | 50 msec | Type B. MIL Illumination. |
| PWR S W_PSSW1_SUP_SHORT | P0606 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits.<br>When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set. | If Feedback Voltage > 97%of KL30_x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| PWR_SW_PSSW2_SUP_OPEN | U3007 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | This fault is not enabled is a Watchdog fault is already set.<br>The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits.<br>When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set. | If Feedback Voltage < 50%of KL30_x | • Power ON, Continuous Failsafing | 50ms | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| PWR SW PSSW2 SUP SHORT | P0606 | This monitor checks if:<br>• Disconnected Switch<br>• PCB Problem | The KL30 1 and KL30 2 voltage supply inputs are individually switched on/off by separate Power Switch circuits.<br>When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set. | If Feedback Voltage > 97%of KL30 x | • Power ON, Continuous Failsafing | 50ms | Type A. MIL Illumination. |
| SY SASIC VCP12_U12_VOLTAGE_LOW | P0606 | This monitor checks if:<br>Defective vehicle battery or Charging system<br>Otherwise:<br>-Defective system ASIC<br>-Defective printed circuit board.<br>• Defective system ASIC | The Polaris ASIC provides an internal VCP12 voltage regulator which is required to operate the I_SSR amplifier and to maintain regulation of the VA5pOregulators and the U3 and U1 linear regulators.<br>If the VCP12 voltage is less that 7.25 V for 44 ?sec then the Polaris sets the VPC12 Low Voltage Warning SPI bit to True.<br>Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set. | VCP12 voltage is less that 7.25 V for 44 ?sec | • Polaris is initialized | 100 msec | Type A. MIL Illumination. |
| SYS_ASIC_CHARGE_PUMP_OVER_VOLT | P0606 | This monitor checks if:<br>• Defective system ASIC | The Polaris ASIC provides atwo-stage charge pump to produce avoltage greater thanthe VCP12 voltage.<br>If the charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec then the Polaris sets the Charge Pump Overvoltage Limit SPI bit to True.<br>Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set. | charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec | • Polaris is initialized | 100 msec (145.2 ms) | Type A. MIL Illumination. |
| SYS_ASIC_VDG_RANGE_FAULT | P0606 | This monitor checks if:<br>• Defective system ASIC | Verify that the KL30_1 Power Switch command is not stuck On.<br>The ASIC VDG pin controls the KL30_1 Power Switch. While the Power Switch is commanded off, the SW reads the ASIC's VDG voltage feedback.<br>When the VDG voltage is continuously >=1,0V for more than 100 msec then the fault is set. | SSRON: VDBat+3V <= VDG <= VDBat+12V<br>SSROFF: VDG <= 1.0V | • Polaris is initialized | 100 msec | Type A. MIL Illumination. |
| SYS_ASIC_VBAT_SW_OVERCURRENT | P0606 | This monitor checks if:<br>• Defective system ASIC | The Polaris ASIC provides an overcurrent protected VBAT_SW output used for powering sensors and external circuits.<br>If the VBAT_SW current draw exceeds 150 mA for 800 ?sec then the Polaris sets the VBAT_SW Overcurrent SPI bit to True.<br>Software monitors this SPI bit. If it is continuously True for more than 25 msec then the fault is set. | VBAT_SW Enable and VBAT_SW Over-Current SPI bits are both TRUE | • Polaris is initialized | 25 msec | Type A. MIL Illumination. |
| SYS_ASIC_VBAT_SW_CORR | P0606 | This monitor checks if:<br>• Defective system ASIC | The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field and perform a plausibility check against the measured U12 voltage from the Polaris.<br>When the difference between the two voltage values is continuously > 1.75V formore than 25 msec then the fault is set. | voltage difference > 1.75 volts | • Polaris is initialized<br>• when the VBAT switch is commanded On | 15 msec | Type A. MIL Illumination. |
| SYS_ASIC_VBAT_SW_DISABLE_CORR | P0606 | This monitor checks if:<br>• Defective wiring harness<br>• Defective ASCI<br>• Defective CPU<br>• Defective circuit board | Check that the ASIC VBAT_SW output is not leaking or stuck On.<br>The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field when the commanded VBAT_SW state is Off.<br>If the voltage is continuously > 1,5V for more than 25 msec then the fault is set. | voltage difference > 1 .5 volts | -Polaris is initialized<br>-Power Switch is OFF | 25 msec | Type A. MIL Illumination. |
| SYS_ASIC_U5_FAILURE | P0606 | This monitor checks if:<br>• Defective system ASIC | The U5 power supply regulates battery voltage down to 5V to supply such circuits as network communication transceivers, internal sensors and ADC references.<br>If U5 is outside the acceptable range (<4.75V or>5.1V) continuously for 105 ?sec then the ASIC shall continue to attempt to regulate U5 and set the U5 Out of Range Warning SPI bit to True.<br>Software monitors this SPI bit. If it becomes True then the fault is set immediately. | The MCU shall monitor the ASIC's U5 Out of Range Warning SPI bit.<br>(<4.75Vor >5.1V) | • Polaris is initialized | 5 msec | Type A. MIL Illumination. |
| SYS_ASIC_CHARGE_PUMP_UNDER_VOLT | P0606 | This monitor checks if:<br>• Defective system ASIC | The Polaris ASIC provides atwo-stage charge pump to produce avoltage greater thanthe VCP12 voltage.<br>If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec then the Polaris sets the Charge Pump Undervoltage Limit SPI bit to True.<br>Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set. | If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec | • Polaris is initialized | 100 msec (105.5 ms) | Type A. MIL Illumination. |
| U5_ASIC_ADC_REF_FAULT | P0606 | This monitor checks if:<br>• Defective system ASIC<br>or circuit board | The 5V regulated supply is read at the ASIC. If it is not within the range, then the fault is set. | Asic U5 is not within the 4.75V and 5.25V | Polaris is initialized | 200 msec | Type A. MIL Illumination. |
| BOOSTED_BRAKE_SYSTEM_FAILED | C0021 | This monitor checks if:<br>Internal eBoost failure | Error TTireshold(Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value).<br><br>X0 : 0 BAR , Y0 : 0 BAR<br>X1 : 6 BAR , Y1 : 3 BAR<br>X2 : 20 BAR , Y2 : 4 BAR<br>X3 : 200 BAR , Y0 : 40 BAR<br><br>When ABS is active the Y values are increased by 30%<br><br>When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msecthe fault will set. | Derivative of the Boost pressure target > (-150 Bar/s)<br>AND<br>Derivative of Boost pressure < 200 Bar/s | The Measured Boost Pressure is compared against an "error threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle.<br>The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar).<br>This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced.<br>When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error.<br>When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode. | 5 ms | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| BOOSTED BRAKE SYSTEM FAILED CRANK | P0562 | This monitor checks if:<br>Internal eBoost failure | Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value).<br><br>XO: 0 BAR , YO: 0 BAR<br>X1 : 6 BAR , Y1 : 3 BAR<br>X2 : 20 BAR , Y2 : 4 BAR<br>X3 : 200 BAR , YO: 40 BAR<br><br>When ABS is active the Y values are increased by 30%<br><br>When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msecthe fault will set. | Derivative of the Boost pressure target > (-150 Bar/s)<br>AND<br>Derivative of Boost pressure < 200 Bar/s<br>and<br>CRANKING is present | The Measured Boost Pressure is compared against an "error threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle.<br>The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar).<br>This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced.<br>When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error.<br>When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode. | 5 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK | C05B0 | This monitor checks if:<br>Monitors for leaks in the braking system at the circuit level during braking events. This is different from the Static Leak check which looks for leaks at the channel level at shutdown. | The leak detection logic compares pressure gradient threshold against the measured pressure gradient.<br>Once the error last longer than a time threshold, and the pressure error integral passes its threshold, leak is detected.<br>The pressure gradient can be estimated from Dap flow rate and PV information; Similarly, pressure can be estimated from Dap volume and PV information. Here the worst case PV is taken | There are 12 calibrations associated with this failsafe so it is impossible to describe the interation of all of them in this document.<br><br>Ulitimately when the pressure error integral exceeds 20 bar AND the pressure gradient error integral exceeds 3000 Bar/s the fault is set. | Boost control active<br><br>Boost pressure > 2 Bar<br><br>Advancing DAP (no replenishment mode)<br><br>No slip control active<br><br>Faded brakes have not been detected | 5 msec | Type A. MIL Illumination. |
| BOOSTED_BRAKE_SYSTEM_LEAK_ISO_FAILED | C05B0 | This monitor checks if:<br>Set if the leakage circuit cannot be isolated successfully | Brake fluid leak on a channel or circuit without the ability to identify the location of the leak | BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK<br>AND<br>Circuit cannot be isolated | BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK already present. | 230 msec | Type A. MIL Illumination. |
| BOOST_POWER_MANAGEMENT_ENABLED_WARNING | P0562 | This monitor checks if:<br>Low input voltage to the module | This fault sets due low voltage in order to disable features before affect boosted brakes operation. | Motor Voltage < 9.3 V | Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > then 3 kph) | 5 occurrences of dipping below 9.3 V within 2 minutes without stable voltage above 11.3V | Type C, No MIL, "Emissions Neutral Diagnostic " |
| BOOST_POWER_MANAGEMENT_ACTIVE_FAILURE | P0562 | This monitor checks if:<br>Low input voltage to the module | Did not detect BOOST_POWER_MANAGEMENT_ENABLED_WARNING Motor Voltage < 7 V(Need for quickly detecting to protect the DAP if for some reason the BOOST_POWER_MANAGEMENT_ENABLED_WARNING is not detected.) | Motor Voltage < 7V | Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > 3 kph) | 17.5 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| BOOSTED_BRAKE_SYSTEM_FAILED_WARNING | C0021 | This monitor checks if:<br>Internal eBoost failure | Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value).<br><br>X0 : 0 BAR , Y0 : 0 BAR<br>X1 : 6 BAR , Y1 : 3 BAR<br>X2 : 20 BAR , Y2 : 11 BAR<br>X3 :200 BAR , Y0 : 155 BAR | Derivative of the Boost pressure target > (-150 Bar/s)<br>AND<br>Derivative of Boost pressure < 200 Bar/s | The Measured Boost Pressure is compared against an "error threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle.<br>The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar).<br>This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced.<br>When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error.<br>When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode. | 750 ms max (fault matures rate depends on the gradient of the boost error) | Type B. MIL Illumination. |
| PTU_ESTABLISH_HOME_POSITION | C0021 | This monitor checks if:<br>Set if motor could not find home position during startup | Motor could not find home position in 4sec. Motor gets stuck somewhere | Motor still moving to find home position for 4 sec | Cycle IGN or Clear Code | 1 msec | Type B. MIL Illumination. |
| ACU_NOT_CONFIGURED | P0602 | This monitor checks if:<br>Set if EOL sensor Learn or Comp Port Learn has not done or failed | Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault | Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault | Learn all EOL sensor, and comp port learn again and clear code | 5 msec | Type A. MIL Illumination. |
| BRAKE_BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE | C0021 | This monitor checks if:<br>Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. | The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition. Otherwise the fault will be matured. | • (Pedal Travel signal is not valid<br>AND<br>SCPis invalid)<br><br>OR<br><br>• Boost Arb targeted pressure is not available<br><br>OR<br><br>• BOOST System in INHIBITED<br><br>OR<br><br>• Electric Drive state is not active or not running<br><br>OR<br><br>• Actuator Control is not allowed | • Pedal travel sensor signal<br>• SCP value<br>• Boost Arb state<br>• Electric drive status | 200 msec | Type B. MIL Illumination. |
| BRAKE BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE_CRANK | P0562 | This monitor checks if:<br>Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. | The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition during CRANKING. Otherwise the fault will be matured. | • (Pedal Travel signal is not valid<br>AND<br>SCPis invalid)<br><br>OR<br><br>• Boost Arb targeted pressure is not available<br><br>OR<br><br>• BOOST System in INHIBITED<br><br>OR<br><br>• Electric Drive state is not active or not running<br><br>OR<br><br>• Actuator Control is not allowed<br><br>OR<br>•CRANKING is present | • Pedal travel sensor signal<br>• SCP value<br>• Boost Arb state<br>• Electric drive status | 200 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| STATIC CIRCUIT© LEAK DETECTED | C05B0 | This monitor checks if:<br>System Leak | Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1 sec. If the pressure drops to 24 bar, this fault is set. | Checks every wheel if there is a leak during shutdown. | Runs During Shutdown | 5 msec | Type A MIL Illumination. |
| STATIC_CIRCUIT1_LEAK_DETECTED | C05B0 | This monitor checks if:<br>System Leak | Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1 sec. If the pressure drops to 24 bar, this fault is set. | Checks every wheel if there is a leak during shutdown. | Runs During Shutdown | 5 msec | Type A MIL Illumination. |
| BRAKEBLEEDNOTCOMPLETED | C15C7 | This monitor checks if:<br>DID NOT write DID B2 | DID B2 == 0 | DID B2==0 | Runs Continuous | 5 msec | Type A MIL Illumination. |
| BOOST-STARTUPFAILURE | P0562 | This monitor checks if: | After mode manger completes system self test the boost system looks to intialize the boost controller. If during this phase the conditions are not correct we will set a fault. | When boost control state is in initialze state a timer is incremented allowing a set time to initialize before a fault should be set. | Run during the power up initialization of boost arbitration | 4 seconds | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EPBSWTNODEFAILURE | U1122 | This monitor checks if:<br>LIN cable not connected to switch (Wiring), EPB fuse, EPB faulted | This fault will be set when the connection to the EPB LIN Switch is disconnected. Increment a counter if the LIN cable is not connected to the switch, this fault will be set if no connection is detected. | No connection detected (Lost Communication) | • Fault will not be set during thefollowing conditions:<br>• within the first 2 seconds after System Power Mode has transitioned to RUN or OFF<br>• Supply Voltage is less than 9V<br>• System Power Mode is in crank mode.<br>• EPB channel failure is not set.<br>• PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set. | Goal = 3 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EBCM_EPB_SWITCH_RSP_MSG_FAULT | U1122 | This monitor checks if:<br>Incoming message is not as expected | The incoming message on LIN is invalid then set this fault | Invalid message | • Fault will not be set during thefollowing conditions:<br>• within the first 2 seconds after System Power Mode has transitioned to RUN or OFF<br>• Supply Voltage is less than 9V<br>• System Power Mode is in crank mode.<br>• EPB channel, node failure is not set.<br>• PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set. | Time = 1 5 msec Goal = 3 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| CAN_0_BUS_OFF_COMMS_FAULT | U0074 | This monitor checks if:<br>• HS bus Shorted<br>• CAN transceiver faulty | Can peripheral locks for the bit errors in transmitted messages and increments txerror counter if any error is detected | if txerror counter reaches 256 and doesn't transmit any message for the fault maturation time. | •When wake lines are enabled.<br>• Node supervisor is in enabled state | 220 msec | Type B. MIL Illumination. |
| CAN_1_BUS_OFF_COMMS_FAULT | U0073 | This monitor checks if:<br>• CE bus Shorted<br>• CAN transceiver faulty | CAN peripheral locks for the bit errors in transmitted messages and increments Txerror counter if any error is detected.<br>if Txerror counter reaches 256 thefault get set. | if txerror counter reaches 256 and doesn't transmit any message for the fault maturation time. | •When wake lines are enabled.<br>• Node supervisor is in enabled state | 220 msec | Type B. MIL Illumination. |
| PB_WAKE_UP_LINE_V0 LTAGE_FAULT | C0616 | This monitor checks if:<br>•Transceiver faulty<br>• PCB probelm | The Swmonitors the A2D feedback received from INH pin of LIN transceiver if this voltage drops below the threshold voltage for 60msec we set this fault indicating EPB wake up is not possible . | If the transceiver feedback drops below voltage 6 v | • Power ON, Continuous Failsafing | 30 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| KEY_TABLE_NOT_PROVISIONED | 111960 | This monitor checks if:<br>• Security peripheral general key is NOT provisioned. | 1) The Authoritative Counter reaches its maximum value.<br>2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0.<br>3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP).<br><br>All messages authenticated using the missing key will be invalidated. Invalidated messages are discarded without any further processing. | 1) The Authoritative Counter reaches its maximum value.<br>2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0.<br>3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP). | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V < VB < 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition<br>• Vehicle is in logistic mode. | 1 count | Type A MIL Illumination. |
| SECURITY_PERIPHERAL_PERFORMANCE | U1961 | This monitor checks if:<br>• Security Peripheral Performance - Performance or Incorrect Operation<br>• Unable to generate a MAC<br>• Unable to verify a MAC | 1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error.<br>2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error.<br><br>• The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds.<br><br>• In the event the security peripheral cannot generate a MAC due to an internal error, the authenticated message shall be broadcast with a MAC equal to zero.<br>• Failed verification means the message is discarded, no failsoft action is taken other than to set the DTC. | 1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error.<br>2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error.<br><br>* The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V < VB < 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition<br>• Vehicle is in logistic mode. | 1 count | Type A MIL Illumination. |
| ECM_AVH_STATUS_FAULT | C15C6 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | When the incoming message is unpacked, the validity bit will be checked immediately. | AVHSwtchStats = 0 | • Fault will not be set during thefollowing conditions:<br>• within the first 5 seconds after System Power Mode has transitioned to RUN<br>• Supply Voltage is not in the range 9V<=V <=16V<br>• Within the first 5 seconds of recovery from an under or over voltage condition<br>CAN Bus Off Failure is latched | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MI SSING_MS G_BOD Y_GEN_I N FO_3 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| ESP_ENG_SPD_STAT_ABOVE_RANGE | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • COMMS Message must be received. When correct message is received by EBCM, it is unpacked and pertinent signals are checked for a range error. | EngSpdStat 0 == 0x02 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 1 Count | Type B. MIL Illumination. |
| MISSING_MSGACTAXLTORQ UE | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| ACT_AXL_TORQUE_SECURITY | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 20 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 20 of 31 | Type B. MIL Illumination. |
| ACT_AXL_TORQUEARC | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 20 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 20 of 31 | Type B. MIL Illumination. |
| MISSING_MSG_STRG_W HLJ NFO | U0131 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 100 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V <= VB >= 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 100ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| STRG_WHLJNFO-ARC | U0420 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWIP_STRG_W HL_ANG_DUD | U0420 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module<br>• Data mask is stuck off<br>• Incorrect SAS installed | • When the incoming message is unpacked, the data mask bit will be checked immediately. | SAS Data Mask Failure indicated if data mask in message 0x1E5 is stuck off (equal to zero) for an extended period | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise | Type C, No MIL, "Emissions Neutral Diagnostic " |
| SWIP_STRG_W HL_ANG_CALIB_STS_FAULT | C0051 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •When the incoming message is unpacked, the calibration bit will be checked immediately. | StrWhlAngSenCalStat == 0x0 | • Fault will not be set during the following conditions:<br>• within the first 5 seconds after System Power Mode has transitioned to RUN<br>• Supply Voltage is not in the range 9V <= V <= 16V<br>• Within the first 5 seconds of recovery from an under or over voltage condition<br>• CAN Bus Off Failure is latched | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_GWCGM_06_MSG | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING GWCGM 34 MSG | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING MSG PSTN OFST FRM TRM 3 | U0132 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PSTN OFST FRM TRM 3 CHCKSUM | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br><br>•Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | ARC + CHKSUM != 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PSTN_OFST_FRM_TRM_3_ARC | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_VEH_LVL_CTL_GEN J NFO_1 | U0132 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| VEH_LVL_CTL_GENJ NFO_1_ARC | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| VEH_LVL_CTL_GENJ NFO_1_PROT_FAULT | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | ARC + Protection_Value != 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_ELEC_PWR_STRG_OVRLY | U0131 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| COMMS_TORQUE_OVERLAY_DELIVERED_STATUS_FAULT | U0420 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | The Brake Control System shall set a code, if Torque Overlay Torque Delivered Status remains $0, Inactive for 250 ms after the brake control system made a steering torque request. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 250 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING_MSG_DAMPER_CTRL_INFO | U0139 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| DAMPER_CTRL_INFO_ARC | U043A | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| DAMPER_CTRL_INFO_PROT_FAULT | U043A | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | ARC + Protection_Value != 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_AUTO_CLT_GENJ_NFO | U1614 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_ALC_VEH_TO P_SPD_LIM | U0132 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ALC_VEH_TOP_SPD_LIM_ARC | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 3 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 3 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ALC_VEH_TOP_SPD_LIM_PROT_FAULT | U0421 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | ARC + Protection_Value != 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 3 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 3 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_BKUP_SYS_PWR_MD | U1607 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| BKUP_SYS_PW R_MD_ARC | U0447 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 5 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 5 of 8 | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING CGM CAN1 MSG04 | U1607 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING CGM CAN1 MSG06 | U1607 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING MSG LAT LONG DATA | U0151 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 100 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 100ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT_LONG_DATA_SECURITY | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LAT_LONG_DATA_ARC | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9V <= V <= 16V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LLDP_VEH_ACC EL_DUD | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module<br>• Data mask is stuck off<br>• Incorrect IMU installed | • When the incoming message is unpacked, the data mask bit will be checked immediately. | IMU Data Mask Failure indicated if data mask in message 0x140 is stuck off (equal to zero) for an extended period | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LLDP_LAT_ACCEL_SNSR_CORR_STS_FAULT | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • When the incoming message is unpacked, the correlation status bit will be checked immediately. | Correlation Status = Unknown | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LLDP_LONG_ACCEL_SNSR_CORR_STS_FAULT | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • When the incoming message is unpacked, the correlation status bit will be checked immediately. | Correlation Status = Unknown | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_OCC PT-RSTRNTJ NFO | U0151 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING MSG PST CLSN INFO | U0151 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| PST CLSN INFO SECURITY | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 5 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 5 of 8 | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| PST CLSN INFO ARC | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | •GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 5 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 5 of 8 | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| STRG_WHL_INFO_SECURITY | U0420 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| MISSING_MSG_YAW_RATE | U0151 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 100 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 100ms | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| YAW_RATE_SECURITY | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| YAW_RATE_ARC | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | •GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |
| YAW_RATE_DUD | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | •When the incoming message is unpacked, the data mask bit will be checked immediately. | Data Mask Failure indicated if data mask in message is stuck off (equal to zero) for an extended period | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under orover voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise | Type C, No MIL,<br>"Emissions Neutral<br>Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| YAW RATE CORR FAULT | U0452 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • When the incoming message is unpacked, the correlation status bit will be checked immediately. | Correlation Status = Unknown | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING ACC GNRL INFO1 FCM | U0265 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING ACC GNRL INFO1 EOCM | U1615 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ACC_GNRL_INFO1-SECURITY | U053B | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ACC_GNRL_INF01 _ARC | U053B | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_MSG_APA_STS | U160C | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| APA_STS_SECURITY | U045A | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| APA_STS_ARC | U045A | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_BCM_CAN2_MSG01 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING CGM CAN2 MSG03 | U1608 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING CGM CAN2 MSG02 | U1608 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING BCM CAN2 MSG04 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSINGJ3CM_CAN2_MSG02 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_BODY_GENJ NFO_1 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_BODY_VEH_SPD_CTL_RESP | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MI SSING_MSG_DRVRJ NTD_AXL_TQ_M N | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MI SSING_MSG_DRVRJ NTD_AXL_TQ_MX | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_DRVRJNTD_TQ | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING_ECM_CAN2_MSG01 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_ECM_CAN2_MSG02 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_ECM_CAN2_MSG03 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| ECM_CAN2_MSG02_ARC | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type B. MIL Illumination. |
| ECM_CAN2_MSG02_PRTCTN_VAL | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | ARC + Protection_Value != 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type B. MIL Illumination. |
| MISSING_GWCGM_92_MSG | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_ECM_CAN2_MSG04 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| CHS_SYS_TOTAL_AXLE_TRQ_REQ_STS_FAILED | C2A07 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • When the incoming message is unpacked, the torque request status will be checked immediately. | Chassis System Total Axle Torque Request Status : Request Status = 2 OR 3 OR 4 OR 5 OR 6<br><br>Following are the ENUMs for Signal CSTATRS_ReqSts<br>$0=No_Request<br>$1=Reque st_Honored<br>$2=Lost_Arbitration<br>$3=Serial_Data_Failure_Temporary<br>$4=Serial_Data_Failure_Permanent<br>$5=ControlS ystem_Failure_Temporary<br>$6=Control_System_Failure_Permanent | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_ECM_CAN2_MSG12 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING EOCM EOCM HCP1 CAN2 MSG01 | U1615 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING FCM CAN2 MSG01 | U0265 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING EXT LGT WSH WPR INFO | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_ENG_SPD | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_EOCM_GNRL_INFO1 | U1615 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EOCM_GNRL_INFO1 -SECURITY | U053B | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EOCM_GNRL_INFO1_ARC | U053B | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_FRT TIRE PRS | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_GWCGM_25_MSG | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING GWCGM 36 MSG | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_GWCGM_90MSG | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSINGL SCMB AUTO BRK | U0265 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LSCMB_AUTO_BRK_SECURITY | U0566 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 4 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 4 of 8 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| LSCMB_AUTO_BRK_ARC | U0566 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 4 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 4 of 8 | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MISSING_OTS_AIR_TMP | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_PRPL_STAT | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_SYS_PWR_MD | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| SYS_PWR_MD_ARC | U0422 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked. «Thereceiver shall check the ARC value with every new received frame.<br>•Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772. | New_ARC - Prev_ARC == 0 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 8 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 8 of 16 | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING TEEN DRVR ACTV | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING MSG TRNS EST GR | U0101 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| TRNSESTGRSECURITY | U0402 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 12 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 12 of 16 | Type B. MIL Illumination. |
| TRNS_EST_GR_ARC | U0402 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 12 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 12 of 16 | Type B. MIL Illumination. |
| MISSING_ECM_TCM_CAN2_MSG01 | U0101 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_ECM_TCM_CAN2_MSG02 | U0101 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| TRNS_OIL_TMP_SIGJ NVALID | U0402 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • When the incoming message is unpacked, the validity bit will be checked immediately. | Transmission Oil Temperature Invalid =1 | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V < VB < 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition<br>•Vehicle is in logistic mode. | 1 count | Type B. MIL Illumination. |
| MISSING_MSG_VEH_MTNJ NFO_1 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| VEH_MTN_INFO_1_SECURITY | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 10 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 10 of 16 | Type B. MIL Illumination. |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| VEH MTN INFO 1 ARC | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 10 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 10 of 16 | Type B. MIL Illumination. |
| MISSINGVEHODODISPVAL | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_MSG_W HLD 1ST | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_BCM_GNRL_INFO1 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_ECM_GNRL_INFO1 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| ECM-GNRLJ NFO1_ARC | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the ARC value with every new received frame.<br>• GM's SUM indicates a failed continuous operation. | • GM's SUM indicates a failed continuous operation. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 12 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 12 of 16 | Type B. MIL Illumination. |
| ECM_GNRLJ NF01_SECURITY | U0401 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring all relevant signals of the messages that are received and unpacked.<br>•The receiver shall check the Protection value with every new received frame.<br>• GM's SUM indicates failed safety and failed security. | • GM's SUM indicates failed safety and failed security. | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | fastest maturation is 12 consecutive count sequence errors.<br>Sliding Window Fail Threshold is 12 of 16 | Type B. MIL Illumination. |
| MISSING_ECM_GNRL_INFO2 | U1611 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_EOCM_EOCM_HCP1_FCM_MSG01 | U1615 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| MISSING GWCGM 51 MSG | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2.5 Counts | Type B. MIL Illumination. |
| MISSING_BCM_CAN2_MSG07 | U0140 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2500 ms | Type B. MIL Illumination. |
| MISSING NODE STATUS CAN2_MSG01 | U1607 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time. | Message missing for 250 msec<br>OR<br><br>Message length is less than defined by DBC | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2500 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| NODE-STSJ PC_LCFA_FAULT | U0447 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | Node Status TCCM3 Loss of Communication Fault Active | Node Status TCCM3 Loss of Communication Fault Active | Fault is not set when:<br><br>• While System Power Mode equals Start<br>• Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion<br>• Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V<br>• Within the first 5 seconds of a recovery from an under or over voltage condition<br>• Within the first 5 seconds of power up reset or a running reset<br>• Bus off state is confirmed or ECU is recovering from a bus off condition | 2500 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| ECU_ID_NOT_PROGRAMMED | P0602 | This monitor checks if:<br>• ECU ID not programmed at ECU/HCU assembly plant | • This fault will be latched, if there is no valid value for Security Data in NVRAM. | NVRAM_SECURE_CODE_BLK_ID == OxFF | • Power Switch is ON | 1 count | Type A. MIL Illumination. |
| VCFG_OPTIONS_NOT_PROG | P0602 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | • The CHASSINF VCFG component extends the former Function Enable logic. It now combines EOL programming with NVRAM and CALibrations, in order to activate/enable functions, features, and subsystems. This means that functionality is present in the code, that will be suppressed until activated by the new VCFG settings. | VCFG settings are not programmed/not available<br><br>Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] == (U8)VCFG_OPTIONS_CHECKS_SOME)<br>OR (Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] > (U8)VCFG_OPTIONS_CHECKS_NONE | • Power Switch is ON | 1 count | Type A. MIL Illumination. |
| VAF_CALIBRATIONI NVALID | P0602 | This monitor checks if:<br>• Problem at signal source<br>• Problem at message source module<br>• Problem with bus wiring<br>• Problem at message receiving module | VAF file not configured properly | None | • Power Switch is ON | 1 count | Type A. MIL Illumination. |
| PB_MICRO_IPC_FAULT | U3000 | This monitor checks if:<br>S12 micro or Champion micro arithmetic failure, S12 micro or Champion micro SPI failure, EMC | • This fault sets when the Champion micro detects an IPC failure with the s12 micro | EPB Micro IPC Counter Fault = TRUE<br>OR<br>EPB Micro IPC CRC Fault = TRUE<br>OR<br>EPB Micro not initializing (not alive) | Continuous | 50 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MICRO_RAM_FAULT | P0604 | This monitor checks if:<br>S12 micro RAM failure | Each RAM cell is consecutively written with test patterns, read back and compared with the expected value. In case of a disagreement, the fault is set<br>At startup, the complete RAM is checked this way, during cyclic operation the RAM is checked cell by cell in the idle loop (complete check « 1s in normal operation, 17 s in sleep mode) | Freescale Micro SW does an initial RAM check and a cyclical RAM check<br><br>To perform a RAM test, a RAM area is written with a special pattern and read back to check its correctness | Continuous | 10 msec | Type A. MIL Illumination. |
| PB_MICROROM_FAULT | C0616 | This monitor checks if:<br>S12 micro ROM failure, S12 micro ALU/instruction set fault | S12 micro calculates aCCITT CRC16 checksum over the complete FLASH memory. If that does not match with the stored checksum, the fault is set<br>The complete ROM is checked during startup, it is consecutively checked during normal operation (complete check takes 1.28 s) and in sleep mode (complete check takes approx. 60 seconds) | Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section. | Continuous | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MICROSTACKF AULT | U3000 | This monitor checks if:<br>S12 micro wrong program execution, instruction execution faults, addressing faults. | Below and above the RSTACK and CSTACK areas of memory, 16 bit RAM cells are written with a pattern. In case of a stack fault, this pattern will be overwritten and very likely changed by that. All patterns are periodically checked that they are not changed | To detect underflow and overflow of the system stacks, a word of RAM is reserved at the end of each of the system stacks. A word of RAM is also reserved at the upper-most address of the stack section. To detect cases where the application exception could be pushing a value onto the stack that matches the test value, the test value that is stored at these reserved addresses will be changed each update. Stacks checked are the: UNDEFINED_MODE_STACK, SUPERVISOR_MODE_STACK, FIQ_MODE_STACK. IRQ_MODE_STACK.<br>If the reserved stack which contains a pattern is overwritten, a fault will be set | Continuous | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MOTOR_SUPPLY_OC | C0616 | This monitor checks if:<br>• open supply | Precondition: no FC_A2D_REFERENCE_FAULT detected!<br>When the measured Motor Supply Voltage is less than 2V the Fault is set. | Motor Supply Voltage < 2v | • No Actuation | 160 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MOTOR_SUPPLY_OC_RR | C0616 | This monitor checks if:<br>• open supply | Precondition: no FC_A2D_REFERENCE_FAULT detected!<br>When the measured Motor Supply Voltage is less than 2V the Fault is set. | Motor Supply Voltage < 2v | • No Actuation | 160 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| PB MICRO ADC REFERENCE FAULT | C0616 | This monitor checks if:<br>ECU internal defect.<br>Incorrect 5V supply from ASIC. | The conversion of all input voltages on the S12 micro is based on an ADC reference voltage. This fault indicates this voltage is outside of expected tolerance so none of the voltage readings can be considered accurate. | The EPB Micro fault flag PB MICRO ADC REFERENCE FAULT= True | Filtered system voltage >= 7.5V<br>AND<br>SYSTEM_VOLTAGE_EXCESSIVE_LOW fault not set. | 50 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MICRO_ADC_CAL_DATAJMPLAUSIBLE | C0616 | This monitor checks if:<br>Wrong calibration, ECU defect | Each S12 micro ADC input has calibration data saved in the EEPROM in Main micro, which is sent from the Main micro to the S12 micro at Initialization multiple times. If all "versions" of these calibrations do not match, the ADC calibration data is considered implausible. | Gain values and offset values are compared between the main micro and the EPB micro. If values disagree, fault is set. | • Periodic | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB MICRO ADC CAL FAULT | C0616 | This monitor checks if:<br>Wrong calibration, ECU defect | This fault is set if valid ADC calibration data is never received by the S12 micro. | Periodic ADC calibration indicates that calibration data is invalid | • Periodic | 1000 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MICRO_ECC_FAILURE | U3000 | This monitor checks if:<br>S12 micro memory controller defect | The S12 micro's memory controller has a test mode in which a memory error can be injected when writing to memory. When reading from that faultily written memory cell and the ECC logic does not detect the fault as expected, the monitor fails | ECC failure detected at time ROM is read for use or when a background ROM check fails | • Periodic | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB-MICROS 12JPC-FAULT | U3000 | This monitor checks if:<br>• Communication error<br>• Crosstalk or arbitration problem | • This fault sets when the s12 micro detects an IPC failure with the Champion micro | • Set when the S12 detects an IPC failure:<br>• ID<br>• Rolling count<br>• Checksum<br>• Length | • EPB micro initialized | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBJMICROJSWITCH_DISCONNECTEDJ_IN | U1122 | This monitor checks if:<br>• Switch disconnected<br>• Defective LIN transceiver<br>• LIN communication error | The EPB switch pattern has to be stable in the state "DISCONNECTED" (LIN bus communication is disturbed). The stability check takes between 80ms and 150ms. Afterwards the fault qualification is started.<br>The total fault detection-time is increased by the delay of the stability check. | Switch disconnected pattern observed | • continuous | 1200 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_MOTOR_MISSINGJ NITIALIZATION_ERROR | C0616 | This monitor checks if:<br>• Calibration values for EPB are missing or out of range | • During initialization, the Park Brake motor offset and gain values are read from NVRAM. If the values are not within an acceptable range, the SW will use default values from ROM. | Calibration values in NVRAM are missing or out of range | • Runs during initialization | 10 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC_LOGICAL_SEQ_MONITOR | C0616 | This monitor checks if:<br>Defective ECU | • Fault is detected by Mando PBC | Program Sequence Fault detected | Vehicle Power Mode: OFF, ACCESSORY, RUN<br>Vehicle Operating Conditions: Dynamic or Static state<br>Exceptions: none | See Detection Rules (fault is detected by Mando PBC) | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC_RUNJ N_NOT_DONE | C0616 | This monitor checks if:<br>Assembly check has not been performed yet | • Fault is detected by Mando PBC | Assembly Test Not Done | Vehicle Power Mode: OFF, ACCESSORY, RUN, Cranking<br>Vehicle Operating Conditions: Dynamic and Static state<br>Exceptions: none | See Detection Rules (fault is detected by Mando PBC) | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC_POWERDOWN_EEPROM_FAILED | C0616 | This monitor checks if:<br>Unexpected Powerdown,<br>Invalid EE<br>• broLacfnfa rfnfn | • Fault is detected by Mando PBC | Actuator status is UNKNOWN due to unexpected power down or EEPROM failure | Vehicle Power Mode: OFF, ACCESSORY, RUN<br>Vehicle Operating Conditions: Dynamic, static state<br>Exceptions: Disabled by calibration, Assembly check is not done | See Detection Rules (fault is detected by Mando PBC) | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC_HOSTJJN AVAILABLE | C0616 | This monitor checks if:<br>Host SW shutdown EPB actuation | • Fault is detected by Mando PBC | Host is not available | Vehicle Power Mode: OFF, ACCESSORY, RUN<br>Vehicle Operating Conditions: Dynamic, static state<br>Exceptions: Disabled by calibration, Non-operational mode | See Detection Rules (fault is detected by Mando PBC) | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_APPLY_ENABLE_WRONG_STATE | C0616 | This monitor checks if:<br>S12 micro/Zenon hardware fault. FET SC/OC. | Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's enable line. | No successful FET activation | Continuous failsafing | 40 s | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_APPLY_ENABLE_NO_CONTROL | C0616 | This monitor checks if:<br>S12 micro/Zenon hardware fault. FET SC/OC. | FET is requested to be activated, but the monitoring shows the FET as unactivated. | No successful FET activation | Continuous failsafing | 10 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_RELEASE_ENABLE_WRONG_STATE | C0616 | This monitor checks if:<br>S12 micro/Zenon hardware fault. FET SC/OC. | Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's line. | No successful FET activation | Continuous failsafing | 40 s | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_RELEASE_ENABLE_NO_CONTROL | C0616 | This monitor checks if:<br>S12 micro/Zenon hardware fault. FET SC/OC. | FET is requested to be activated, but the monitoring shows the FET as unactivated. | No successful FET activation | Continuous failsafing | 10 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EPB_COMMAND_RANGE_ERROR | C0616 | This monitor checks if:<br>• EPB decel request out of range | • This failsafe monitors the decel request received from the EPB and checks to see if it is out of range | Decel Request from EPB is greater than 9.83 m/s | • Continuous failsafing | 250 msec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC-CRANK ING_TIMEOUT | C0616 | This monitor checks if:<br>Power mode is Cranking | • When power mode is cranking, suspend actuation as long as it is cranking until timeout after 5 seconds | When<br>Power Mode = Cranking,<br>Then<br>Suspend actuation as long as it is cranking and also provide the following options to Mando:<br>1. Timeout after 5 seconds and set the fault<br>2. Continue actuation | Power mode is Cranking | 5 sec | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PB_HSBJNIT_FAULT | C0616 | This monitor checks if:<br>• Failure of the Host Safety Barrier to complete its normal initialization. | • The HSB self test is included in the system self test, and it is run to ensure that the HSB still has control over the apply/release enable lines. This fault also sets if indeterminate states of the enable lines are detected. | HSB Initialization Failed | Runs during system self test | 10 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EPB_ASSIST_CURRENT_FEEDBACK_EXCEEDED | C0616 | This monitor checks if:<br>Excessive clamp force request. Ex. | Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec while the motor is being requested to apply clamp force | Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec | Runs continuously during EPB Assist | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |
| EPB_ASSIST_CURRENT_FEEDBACK_IMPLAUSIBLE | C0616 | This monitor checks if:<br>Request for clamp force with no feedback | If during EPB assist active control the current feedback doesn't exceeded min current for x number of requests for activation | Feedback Current < Min Current for > 150 msec. The results in 1 count | Runs continuously during EPB Assist | >= 4 counts | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBC_HOSTJGNORED_COMMAND | C0616 | This monitor checks if:<br>Defective ECU, or wrong conditions when EPB actuation was requested | PBC detects this fault if "Motor Driver State" does not change to current value of "Motor Command" for over 100ms, PBC sets FaultStatus[33] as Failed' and cancel the current actuation request (MotorCommand = STOP and then NONE) (Refer VDA#R3.177) | "Motor Driver State" does not change to current value of "Motor Command" for over 100ms | Vehicle Power Mode: OFF, ACCESSORY, RUN<br>Vehicle Operating Conditions: static state<br>Exceptions: Disabled by calibration, Non-operational mode | 100ms | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitoring Strategy Description | Fault Detection Criteria | Threshold Value | Secondary Parameter and Enable Condition | Maturation Time | MIL Illumination |
|---|---|---|---|---|---|---|---|
| PB UNDERVOLTAGE | P0562 | This monitor checks if:<br>• Vehicle Battery Voltage Supply is providing low voltage levels.<br>• Defective cables.<br>• Defective printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank.<br>When the system voltage is continuously lower than 8.5V for more than 150 msec then the fault is set.<br>When the system voltage is continuously greater than 9.0V for more than 100 msec then the fault is cleared. | Filtered system voltage < 8.5V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 150 ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| PBOVERVOLTAGE | P0563 | This monitor checks if:<br>• Voltage Supply is providing high voltage levels.<br>• Defective printed circuit board. | System voltage is monitored continuously but the fault is not enabled during Engine crank.<br>When the system voltage is continuously greater than 16.8V for more than 100 msec then the fault is set.<br>When the system voltage is continuously less than 16.3V for more than 100 msec then the fault is cleared. | Filtered system voltage > 16.8 V | • Engine is not being cranked<br>• System is not re-initializing or shutting down<br>• System is not shutting down | 100 ms | Type B. MIL Illumination. |
| TASK OVERRUN COREO | P0606 | This monitor checks if:<br>Software Error<br>ECU Hardware Failure<br>Input Signals To ECU causing high interrupt load | A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set. | multiple activation counter >= max number of activations<br><br>Task_Overrun_Cnt>0 | Always Enabled | 9 counts<br>Time: 10 ms<br>Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit. | Type A. MIL Illumination. |
| TASK_OVERRUN_CORE1 | P0606 | This monitor checks if:<br>Software Error<br>ECU Hardware Failure<br>Input Signals To ECU causing high interrupt load | A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set. | multiple activation counter >= max number of activations<br><br>Task_Overrun_Cnt>0 | Always Enabled | 9 counts<br>Time: 10 ms<br>Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit. | Type A. MIL Illumination. |
| TASK_OVERRUN_CORE2 | P0606 | This monitor checks if:<br>Software Error<br>ECU Hardware Failure<br>Input Signals To ECU causing high interrupt load | A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set. | multiple activation counter >= max number of activations<br><br>Task_Overrun_Cnt>0 | Always Enabled | 9 counts<br>Time: 10 ms<br>Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit. | Type A. MIL Illumination. |
| RUNNING_RESET_FAILURE | P0562 | This monitor checks if:<br>• Keep Alive Voltage Regulator not functional.<br>• Processor looses complete power (system voltage).<br>• Processor is incorrectly reset. | • Two blocks in NVRAM are used to failsafe the systems mode manager's ability to control the system shutdown process. During system initialization (each new ignition cycle), the contents of these two blocks are compared. If a mismatch is found, it indicates that mode manager was unable to control the system shutdown process on the previous ignition cycle.<br>• Counter: Count 1-up<br>• Monitor Rate: 10ms<br><br>Note- This fault also sets when there is a startup after an improper shutdown with the vehicle not in park AND with the drivers foot on the brake pedal. | System failed to finish NVRAM update on the last module shut-down (ex. Disconnect battery from module before shutdown) | • Arb Boost State >= Enabled<br>• A controlled shutdown is detected<br>• System power mode != Diagnostic mode<br>•PRNDL Position !=PARK<br>•Vehicle is moving as defined by WSS != IDLE or Invalid | 5ms | Type C, No MIL, "Emissions Neutral Diagnostic " |
| MPU_FAULT_TRW_SCS_COREO | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission. | None | Always Enabled | 10 ms | Type A. MIL Illumination. |
| MPU_FAULT_TRW_SCS_CORE1 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission. | None | Always Enabled | 10 ms | Type A. MIL Illumination. |
| MPU_FAULT_TRW_SCS_CORE2 | P0606 | This monitor checks if:<br>Software Error<br>Partial Microcontroller Failure | Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission. | None | Always Enabled | 10 ms | Type A. MIL Illumination. |
| ITBC-LSM-FAULT | P0606 | This monitor checks if:<br>If the ITBC tasks execute out of order, or if a task is skipped or if the tasks do not complete, then this fo rlh io cnf | Set this fault , if the order of execution of ITBC tasks is not correct. If the tasks skip or if some tasks are left incomplete | None | • LIN communication | 10 msec | Type A. MIL Illumination. |
| ICC-FAILURE-COREO | P0606 | This monitor checks if:<br>ICC send or receive have been skipped. | ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault.<br><br>The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot. | At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. | Always Enabled | 60 msec | Type A. MIL Illumination. |
| ICC_FAILURE_CORE1 | P0606 | This monitor checks if:<br>ICC send or receive have been skipped. | ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault.<br><br>The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot. | At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. | Always Enabled | 60 msec | Type A. MIL Illumination. |
| ICC_FAILURE_CORE2 | P0606 | This monitor checks if:<br>ICC send or receive have been skipped. | ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault.<br><br>The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot. | At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. | Always Enabled | 60 msec | Type A. MIL Illumination. |
| MISSING_FLY_BACK_D10 DE_FAULT | U3000 | This monitor checks if:<br>• Fly Back Diode is Missing | • This fault only runs if SW is compiled with DEVELon | SW detects that a fly back diode is missing | • Power Switch is ON | 1 count | Type C, No MIL, "Emissions Neutral Diagnostic " |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| CGM Control Module Memory Failure | B2B12 | This DTC monitors for a CGM Control Module Memory Failure error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Memory Failure DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| CGM Control Module Internal Performance Failure | B2B13 | This DTC monitors for a CGM Control Module Internal Performance Failure error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Internal Performance Failure DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Performance | C0522 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 1 fail time,<br>50 millisecond update rate | > 0.1500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 1 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 1 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br>< 0.70 %<br>> 80.0 Nm<br>> 0.1500 g<br><br>> 15.0 KPH<br>< 200.0 KPH | raw longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time> 120.0 seconds,<br>50 millisecond update rate<br><br>region 1 fail time > 75.0 seconds out of region 1 sample time > 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ABS(raw longitudinal acceleration signal) update sample time<br><br>LI0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | < 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 2 fail time,<br>50 millisecond update rate | > 0.1500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 2 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal) | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate<br><br>region 2 fail time > 75.0 seconds<br>out of region 2 sample time > 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | update region 2 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal) update sample time<br><br>LI0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | <br><br>< 0.70 %<br>> 80.0 Nm<br>> 0.1500 g<br><br>> 0.0 KPH<br>< 0.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 3 fail time,<br>50 millisecond update rate | > 0.1500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 3 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time> 120.0 seconds,<br>50 millisecond update rate<br><br>region 3 fail time > 75.0 seconds out of region 3 sample time > 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 3 sample time:<br>brake pedal position<br>engine torque<br>ABS(TOSS vehicle speed acceleration)<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal)<br>update sample time<br><br>LI0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | = FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br>< 0.70 %<br>> 80.0 Nm<br>< 0.1000 g<br><br>> 0.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 4 fail time,<br>50 millisecond update rate | > 0.1500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 3 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | diagnsotic fault sequence<br>gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 4 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal)<br>update sample time<br><br>LI0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | = FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br><br>< 0.70 %<br>< 80.0 Nm<br>< 0.1500 g<br><br>> 0.0 KPH<br>< 0.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | region 4 fail time > 75.0 seconds out of region 4 sample time > 120.0 seconds, 50 millisecond update rate | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Circuit Low | C0553 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | raw longitudinal acceleration signal when sensor type is directly proportional<br>OR<br>raw longitudinal acceleration signal when sensor type is inversely proportional<br><br>update raw longitudinal acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | < -3.8500 g<br><br>> -3.8500 g<br><br>(< 0.5 Q impedance between signal and controller ground) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw longitudinal acceleration signal stability time > 15.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Circuit High | C0554 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | raw longitudinal acceleration signal when sensor type is directly proportional<br>OR<br>raw longitudinal acceleration signal when sensor type is inversely proportional<br><br>update raw longitudinal acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | > 3.8500 g<br><br>< 3.8500 g<br><br>(< 0.5 Q impedance between signal and controller power) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw longitudinal acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Circuit Low | C124F | Controller specific analog circuit diagnoses the raw lateral acceleration signal fora short to ground or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | raw lateral acceleration signal when sensor type is directly proportional<br>OR<br>raw lateral acceleration signal when sensor type is inversely proportional<br><br>update raw lateral acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | < -3.8500 g<br><br>> -3.8500 g<br><br>(< 0.5 Q impedance between signal and controller ground) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw lateral acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Circuit High | C1250 | Controller specific analog circuit diagnoses the raw lateral acceleration signal fora short to power or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | raw lateral acceleration signal when sensor type is directly proportional<br>OR<br>raw lateral acceleration signal when sensor type is inversely proportional<br><br>update raw lateral acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | > 3.8500 g<br><br>< 3.8500 g<br><br>(< 0.5 Q impedance between signal and controller power) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw lateral acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Performance | C1251 | Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | ABS(raw lateral acceleration signal)<br>AND<br>ABS(raw lateral acceleration signal)<br><br>update raw lateral acceleration signal fail, 50 millisecond update rate | > 0.5300 g<br><br>< 3.8500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>update raw lateral acceleration signal stablity time:<br>TOSS vehicle speed<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br><br>ABS(raw lateral acceleration signal) update sample time<br><br>U0073 fault active<br>U0073 test fail this key on<br>DTCs not fault active | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>> 15.0 KPH<br>= TRUE<br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br><br>< 0.5300 g<br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA | raw lateral acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time> 120.0 seconds,<br>50 millisecond update rate | TypeC, 1 Trip No MIL Emissio ns Neutral "Emissio ns Neutral Diagnost ic- Type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Camshaft Actuator Solenoid Circuit Open - Bank 1 | P0010 | Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between signal and controller ground. | P0010is Enabled<br><br>System supply voltage<br><br>Output driver is commanded on<br><br>Ignition switch is in crank or run position | > 11.00 Volts | 20 failures out of 25 samples<br><br>250 ms /sample, continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Camshaft System Performance - Bank 1 | P0011 | Detects a VVT system error by comparing the desired and actual cam positions when WT is activated. | Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive. | (Intake cam Bank 1)<br><br>Cam Position Error > ( **P0011_CamPosErrorLimId** ) deg | **Intake Cam Phsr Enable**<br><br>System Voltage<br><br>Engine Running<br><br>Power Take Off (PTO) active<br><br>Desired cam position<br><br>Desired AND Measured cam position<br><br>Desired cam position variation<br><br>No Active DTCs | = TRUE<br><br>> 11.00 Volts<br><br>= TRUE<br><br>= FALSE<br><br>> 0 deg<br><br>> ( **P0011_CamPosErrorLimIc1** ) deg AND < **(CalculatedPerfMaxId)** deg<br><br>< 7.50 deg for ( **>0011_P05CC_StablePositionTimeId** ) seconds<br><br>P0010<br>P2088<br>P2089 | 100.00 failures out of 500.00 samples<br><br>100 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 SensorA | P0016 | Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensorA occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range | Out of range cam edge measurements in one engine cycle<br><br>Out of range values are:<br><br>cam edge measurement OR<br>cam edge measurement<br><br>from the expeced nominal cam position | >= 2 cam edges<br><br>< -11.OCrank Degrees<br><br>>11.0 Crank Degrees | Crankshaft and camshaft position signals are synchronized<br><br>Engine is Spinning<br><br>Cam phaser control indcates the phaser is 'parked'<br><br>No Active DTCs:<br><br>Time since last execution of a test<br><br>IntCamECC_OilPresLow | Testis Enabled<br><br>CrankSensor_FA<br>P0340, P0341<br><br>> 1.0 sec<br><br>= FALSE | 4 cam edge measurements and 1 test sample per engine cycle<br><br>Test failure is 4 fails in 5 samples<br><br>Diagnostic failure is 2 failed tests out of 3<br><br>If the first test fails, the next test is delayed to confirm the phaser 'parked'<br><br>This delay time is defined by **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold**<br><br>For mid-park phasers, an additional delay **P0016-0019 Mid-Park Phaser Delay** is applied | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank 1 Sensor 1 | P0030 | Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips<br>Note: In certain controlle rs P0031 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bankl Sensori | P0031 | Controller specific output driver circuit diagnoses the heater output low sided driver fora short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips<br>Note: In certain controlle rs P0030 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bankl Sensori | P0032 | Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedance between output and controller power. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank 1 Sensor 2 | P0036 | Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition<br>Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips<br>Note: In certain controlle rs P0037 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bankl Sensor2 | P0037 | Controller specific output driver circuit diagnoses the heater output low sided driver fora short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips Note: In certain controlle rs P0036 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bankl Sensor2 | P0038 | Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedance between output and controller power. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank 2 Sensor 1 | P0050 | Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips<br>Note: In certain controlle rs P0051 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank2 Sensori | P0051 | Controller specific output driver circuit diagnoses the heater output low sided driver fora short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition<br>Voltage<br>Engine Speed | <br><br>= Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips Note: In certain controlle rs P0050 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank2 Sensori | P0052 | Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedance between output and controller power. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| HO2S Heater Resistance Bank 1 Sensor 2) (For Dual Bank Exhaust Only | P0054 | Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor.<br><br>This fault is set if the heater resistance is outside the expected range. | Heater Resistance outside of the expected range of | -3.0 < ohms <2.3 | Diagnostic is Disabled<br><br>No Active DTC's<br><br>Coolant- IAT<br>Engine Soak Time<br>Coolant Temp<br>Ignition Voltage<br>Engine Run time | ECT_Sensor_FA<br>P262B<br>IAT_SensorFA<br>< 8.0 °C<br>>28,800 seconds<br>> -30.0 °C<br>< 32.0 volts<br>< 0.04 seconds | Once per valid cold start | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank 2 Sensor 2 | P0056 | Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition<br>Voltage<br>Engine Speed | = Crank or Run<br>>11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips<br>Note: In certain controlle rs P0057 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank2 Sensor2 | P0057 | Controller specific output driver circuit diagnoses the heater output low sided driver fora short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Ignition<br>Voltage<br>Engine Speed | <br><br>= Crank or Run<br>> 11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips Note: In certain controlle rs P0056 may also set |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Control Circuit Bank2 Sensor2 | P0058 | Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedance between output and controller power. | Diagnostic is Enabled<br><br>Ignition Voltage<br>Engine Speed | = Crank or Run<br>> 11.0 volts<br>> 400 RPM | 20 failures out of 25 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| HO2S Heater Resistance Bank 2 Sensor 2 | P0060 | Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor.<br><br>This fault is set if the heater resistance is outside the expected range. | Heater Resistance outside of the expected range of | 3.4 < ohms < 8.6 | Diagnostic is Enabled<br><br>No Active DTC's<br><br>Coolant- IAT<br>Engine Soak Time<br>Coolant Temp<br>Ignition Voltage<br>Engine Run time | ECT_Sensor_FA<br>P262B<br>IAT_SensorFA<br><8.0 °C<br>>28,800 seconds<br>> -30.0 °C<br>< 32.0 volts<br><0.09 seconds | Once per valid cold start | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| MAP / MAF / Throttle Position Correlation | P0068 | Detect when MAP and MAF do not match estimated engine airflow as established by the TPS | Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails<br><br>Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails | Table, f(TPS). See supporting tables: **P0068_Delta MAP Threshold f(TPS)**<br><br>Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)**<br><br>Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)**<br><br>Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)** | Engine Speed<br><br>Run/Crank voltage | > 800 RPM<br><br>>6.41 Volts | Continuously fail MAP and MAF portions of diagnostic for 0.1875s<br><br>Continuous in MAIN processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Outside Air Temperature (OAT) Sensor Circuit Performance | P0071 | Detects an Outside Air Temperature (OAT) sensorthat is stuck in range. There are two components to the test: an engine off component, and an engine running component.<br><br>If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled.<br><br>If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move.<br><br>For applications that have ability to move without engaging the internal combustion | **Engine Off:**<br><br>If IAT >= OAT:<br>IAT - OAT<br><br>If IAT < OAT:<br>OAT - IAT<br><br>If either of the following conditions are met, this diagnostic will pass:<br><br>If IAT >= OAT:<br>IAT - OAT<br><br>If IAT < OAT:<br>OAT - IAT | > 20.0 deg C<br><br>> 20.0 deg C<br><br><= 20.0 deg C<br><br><= 20.0 deg C | Diagnostic is Enabled<br><br>Time between current ignition cycle and the last time the engine was running<br><br>Engine is not running<br><br>Vehicle Speed<br><br>Coolant Temperature - IAT<br><br>IAT - Coolant Temperature<br><br>OAT-to-IAT engine off equilibrium counter<br><br>The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off**<br><br>No Active DTCs: | >= 28,800.0 seconds<br><br>>= 15.5 MPH<br><br>< 15.0 deg C<br><br>< 15.0 deg C<br><br>>= 300.0 counts<br><br>VehicleSpeedSensor_FA<br>IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA | Executed every 100 msec until a pass or fail decision is made | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared.<br><br>While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail. | | | | EngineModeNotRunTimerError | | |
| | | | **Engine Running:**<br><br>If IAT >= OAT:<br>IAT - OAT<br><br>If IAT < OAT:<br>OAT - IAT<br><br>If either of the following conditions are met, this diagnostic will pass:<br><br>If IAT >= OAT:<br>IAT - OAT<br><br>If IAT < OAT:<br>OAT - IAT | > 20.0 deg C<br><br>> 20.0 deg C<br><br><= 20.0 deg C<br><br><= 20.0 deg C | Diagnostic is Enabled<br><br>Time between current ignition cycle and the last time the engine was running<br><br>Engine is running<br><br>Vehicle Speed<br><br>Engine airflow<br><br>OAT-to-IAT engine running equilibrium counter<br><br>The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running**<br><br>No Active DTCs: | >= 28,800.0 seconds<br><br>>= 15.5 MPH<br><br>>= 10.0 grams/second<br><br>>= 300.0 counts<br><br>VehicleSpeedSensor_FA | Executed every 100 msec until a pass or fail decision is made | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | If the engine off component of the diagnostic was enabled, but did not make a pass or fail decision, the engine running component will begin executing when the internal combustion engine starts to run.<br><br>If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine running equilibrium counter". The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared.<br><br>While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for | | | | IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA<br>EngineModeNotRunTimer Error | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Outside Air Temperature (OAT) Sensor Circuit Low | P0072 | Detects a continuous short to ground in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too low. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature. | Raw OAT Input | <= 46 Ohms (-150 degC) | Diagnostic is Enabled | | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Outside Air Temperature (OAT) Sensor Circuit High | P0073 | Detects a continuous open circuit in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too high. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature. | Raw OAT Input | >= 427,757 Ohms (~-60 deg C) | Diagnostic is Enabled | | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Outside Air Temperature (OAT) Sensor Intermittent In-Range | P0074 | Detects a noisy or erratic signal in the OAT circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected.<br><br>When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”.<br><br>Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br><br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous) | > 100 deg C<br><br>10 consecutive OAT readings | Diagnostic is Enabled | | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module SIDI High Pressure Pump min/ max authority | P0089 | This DTC determines when the high pressure pump control has reached to its max or min authority | High Pressure Fuel Pump Delivery Angle<br><br>OR<br><br>High Pressure Fuel Pump Delivery Angle | >= 130°<br><br><br><br><= 0° | High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br><br><br><br><br><br><br>Barometric Pressure<br>Inlet Air Temp<br><br><br>Fuel Temp<br><br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECTNot FAand Low side Fuel Pump Relay ckt Not FAand Estimate fuel rail pressure is valid and<br>Green Engine (In | True<br><br><br><br>>=11 Volts<br><br>> 0.180 MPa<br><br><br>Enabled when a code clear is not active or not exiting device control<br><br>Engine is not cranking<br><br><br>>= 70.0 KPA<br>>— -20.0 degC<br><br><br>-12 <= TempdegC <= 132 | Windup High/ Low<br><br>10.00 seconds failures out of 12.50 Seconds samples | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement detected is true andManufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| High Pressure Pump Control Solenoid Enable Low Side Open Circuit | P0090 | Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground | Engine Speed<br><br>Battery Voltage | >= 50 RPM<br><br>>=11 Volts<br><br>Not in pump device control<br>Enabled when a code clear is not active or not exiting device control | 20 failures out of 40 samples<br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| High Pressure Pump Control Solenoid Enable Low Side Short to Ground | P0091 | Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 0.1 Amps between signal and controller ground | Engine Speed<br><br>Battery Voltage | >=50 RPM<br><br>>=11 Volts<br><br>Not in pump device control<br>Enabled when a code clear is not active or not exiting device control | 20 failures out of 40 samples<br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power | P0092 | Controller specific output driver circuit diagnoses diagnoses High Pressure pump Control Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1.1 or 15 Amps selectable thershold based on High pressure Pump . | Engine Speed<br><br>Battery Voltage | >= 50 RPM<br><br>>= 11 Volts<br><br>Not in pump device control<br>Enabled when a code clear is not active or not exiting device control | 20 failures out of 40 samples<br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor, but no manifold temperature sensor) | P0096 | Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and coolant temperature sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and coolant temperature values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled.<br><br>The diagnostic will fail if the IAT and coolant temperature values are similar, and the IAT2 value is not similar to the IAT and coolant temperature values.<br><br>This diagnostic is executed once per ignition cycle if the enable conditions are met. | ABS(Power Up IAT-Power Up IAT2)<br><br>AND<br><br>ABS(Power Up ECT-Power Up IAT2)<br>>=<br>ABS(Power Up ECT-Power Up IAT) | > 25 deg C | Diagnostic is Enabled<br><br>Time between current ignition cycle and the last time the engine was running<br><br>Powertrain Relay Voltage for a time<br><br>No Active DTCs:<br><br>LIN communications established with MAF | > 28,800 seconds<br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br>PowertrainRelayFault<br>ECT_Sensor_Ckt_FA<br>IAT_SensorCircuitFA<br>HumTempSnsrCktFA<br>EngineModeNotRunTimer Error | Executes once at the beginning of each ignition cycle if enable conditions are met | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF) | P0097 | Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too low.<br><br>The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | IAT 2 Temperature | < -60 degrees C | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>LIN communications established with MAF<br><br>No Active DTCs: | <br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br><br><br>PowertrainRelayFault | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Circuit 2 High (applications with LIN MAF) | P0098 | Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too high.<br><br>The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | IAT 2 Temperature | > 150 degrees C | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>LIN communications established with MAF<br><br>No Active DTCs: | <br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br><br><br>PowertrainRelayFault | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity) | P0099 | Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected.<br><br>When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current IAT2 reading - IAT 2 reading from 100 milliseconds previous) | > 100.00 deg C<br><br>10 consecutive IAT 2 readings | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>No Active DTCs:<br><br>LIN communications established with MAF | >= 11.0 Volts<br>>= 0.9 seconds<br><br>PowertrainRelayFault | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| High Pressure Start Diagnostic | P00C6 | The DTC Diagnoses the high side fuel pressure during engine cranking. | The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking<br><br>Pressure Rise Test:<br>Sensed High Pressure Fuel Rail Pressure value<br><br>Pressure Fall Test:<br>Sensed High Pressure Fuel Rail Pressure value | <<br>**P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery**<br>(see Supporting Table)<br><br><=<br>**P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start**<br>(see Supporting Table) | High Pressure Rise Diagnostic During Start<br><br>High Pressure Fall Diagnostic During Start<br><br>Low side feed fuel pressure<br><br>Engine Run Time<br>Run/Crank Voltage<br>Engine Coolant<br><br>For each engine start, only 1 diagnostic is performed. The pressure rise test will run if High side fuel pressure is less than KtFHPC p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking. | Enabled<br><br>Disabled<br><br>>= 0 KPA<br><br>< = 0 sec<br>> 8 Volts<br>-100 <= °C <= 132<br><br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) and<br>Cam or Crank Sensor Not FA and<br>IAT, IAT2 and ECT Not FA and<br>Low side Fuel Pump Relay ckt Not FA and<br>Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control | Pressure Rise Test:<br>Crank Time >=<br>**P00C6 - High Pressure Pump Control Mode timeout**<br>(see Supporting Table)<br>6.25 ms per sample<br><br>Pressure Fall Test:<br>Injected cylinder events >=<br>**P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start**<br>(see Supporting Table)<br><br>8 samples per engine rotation | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Barometric Pressure<br>Inlet Air Temp | commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement detected is true and<br>Manufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active<br>>= 70.0 KPA<br>>= -20.0 DegC | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Pressure Measurement System - Multiple Sensor Correlation (naturally aspirated with TIAP/ Baro sensor) | P00C7 | Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor.<br><br>If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP) and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If one of the sensors is outside the normal expected atmospheric pressure range, this monitor will fail. Otherwise, MAP and BARO are compared to see if their values are similar.<br><br>If the MAP and BARO values are not similar, there are no other pressure sensors to compare against to identify which sensor is not rational. The Multiple Pressure | ABS(Manifold Pressure - Baro Pressure) | > 10.0 kPa | Time between current ignition cycle and the last time the engine was running<br><br>Engine is not rotating<br><br>Manifold Pressure<br>Manifold Pressure<br>Baro Pressure<br>Baro Pressure<br><br>No Active DTCs:<br><br>No Pending DTCs:<br><br>Diagnostic is Enabled<br><br>LIN communications established with MAF | > 5.0 seconds<br><br>>= 50.0 kPa<br><= 115.0 kPa<br>>= 50.0 kPa<br><= 115.0 kPa<br><br>EngineModeNotRunTimerError<br>MAP_SensorFA<br>AAP_SnsrFA<br>AAP_LIN1_SnsrCktFA<br><br>MAP_SensorCircuitFP<br>AAP_SnsrCktFP<br>AAP_LIN1_SnsrCktFP | 4 failures out of 5 samples<br><br>1 sample every 12.5 msec for applications without LIN MAF<br><br>1 sample every 25 msec for applications with LIN MAF | Type B, 2 Trips |
| | | | Manifold Pressure<br>OR<br>Manifold Pressure | < 50.0 kPa<br><br>> 115.0 kPa | Time between current ignition cycle and the last time the engine was running<br><br>Engine is not rotating<br><br>No Active DTCs:<br><br>No Pending DTCs: | > 5.0 seconds<br><br>EngineModeNotRunTimerError<br>MAP_SensorCircuitFA<br>AAP_SnsrCktFA<br>AAP_LIN1_SnsrCktFA<br><br>MAP_SensorCircuitFP<br>AAP_SnsrCktFP | 4 failures out of 5 samples<br><br>1 sample every 12.5 msec for applications without LIN MAF<br>1 sample every 25 msec for applications with LIN MAF | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Sensor Correlation Diagnostic will fail in this case. | | | Diagnostic is Enabled<br><br>LIN communications established with MAF | AAP_LIN1_SnsrCktFP | | |
| | | | Barometric Pressure<br>OR<br>Barometric Pressure | < 50.0 kPa<br><br>> 115.0 kPa | Time between current ignition cycle and the last time the engine was running<br><br>Engine is not rotating<br><br>No Active DTCs:<br><br>No Pending DTCs:<br><br>Diagnostic is Enabled<br><br>LIN communications established with MAF | > 5.0 seconds<br><br>EngineModeNotRunTimer Error<br>MAP_SensorCircuitFA<br>AAP_SnsrCktFA<br>AAP_LIN1_SnsrCktFA<br><br>MAP_SensorCircuitFP<br>AAP_SnsrCktFP<br>AAP_LIN1_SnsrCktFP | 4 failures out of 5 samples<br><br>1 sample every 12.5 msec for applications without LIN MAF<br><br>1 sample every 25 msec for applications with LIN MAF | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground | P00C9 | Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 1.1 or 15 Amps selectable thershold based on High pressure Pump. | Engine Speed<br>Battery Voltage | >= 50 RPM<br>>= 11 Volts<br><br>Not in pump device control<br>Enabled when a code clear is not active or not exiting device control | 20 failures out of 40 samples<br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power | POOCA | Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 0.1 Amps between signal and controller power | Engine Speed<br>Battery Voltage | >= 50 RPM<br>>= 11 Volts<br><br>Not in pump device control<br>Enabled when a code clear is not active or not exiting device control | 20 failures out of 40 samples<br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Humidity Sensor Circuit Low (applications with LIN MAF) | P00F4 | Detects an eroneously low value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too low.<br><br>The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | Relative Humidity | <= -6.25 % | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>LIN communications established with MAF<br><br>No Active DTCs: | <br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br><br><br>PowertrainRelayFault | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Humidity Sensor Circuit High (applications with LIN MAF) | P00F5 | Detects an eroneously high value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too high.<br><br>The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | Relative Humidity | >= 106.25 % | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>LIN communications established with MAF<br><br>No Active DTCs: | <br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br><br><br>PowertrainRelayFault | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Humidity Sensor Circuit Intermittent | P00F6 | Detects a noisy or erratic signal in the humidity circuit by monitoring the humidity sensor and failing the diagnostic when the humidity signal has a noisier output than is expected.<br><br>When the value of relative humidity in % is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of humidity readings. The result of this summation is called a “string length”.<br><br>Since the humidity signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic humidity signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous) | > 80 %<br><br>10 consecutive Humidity readings | Diagnostic is Enabled<br><br>Powertrain Relay Voltage for a time<br><br>No Active DTCs:<br><br>LIN communications established with MAF | >= 11.0 Volts<br>>= 0.9 seconds<br><br>PowertrainRelayFault | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Mass Air Flow System Performance (naturally aspirated) | P0101 | Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range.<br><br>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS).<br><br>These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic will fail. | Filtered Throttle Model Error<br>AND<br>ABS(Measured Flow - Modeled Air Flow) Filtered<br>AND<br>ABS(Measured M A P - MAP Model 2) Filtered | <= 250 kPa*(g/s)<br><br>> 25.0 grams/sec<br><br>> 22.0 kPa | Engine Speed<br>Engine Speed<br><br>(Coolant Temp<br>OR<br>OBD Coolant Enable Criteria<br><br>(Coolant Temp<br>OR<br>OBD Max Coolant Achieved<br><br>Intake Air Temp<br>Intake Air Temp<br><br>Minimum total weight factor (all factors multiplied together)<br><br>See Residual Weight Factor tables. | >= 0 RPM<br><= 5,400 RPM<br><br>>= -9 Deg C<br><br>= TRUE)<br><br><= 130 Deg C<br><br>= FALSE)<br><br>-20 Deg C<br><= 129 Deg C<br><br>>= 0.50<br><br>Filtered Throttle Model Error multiplied by<br>**P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**<br><br>Modeled Air Flow Error multiplied by<br>**P0101, P0106, P010B, P0121, P012B, P0236, P1101:MAF1 Residual Weight Factor based on RPM**<br>and<br>**P0101, P0106, P010B, P0121, P012B, P0236, P1101:MAF1 Residual Weight Factor based on MAF Est** | Continuous<br><br>Calculation are performed every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** | | |
| | | | | | No Active DTCs: | MAP_SensorCircuitFA<br>EGRValvePerformance_FA<br>MAF_SensorCircuitFA<br>CrankSensor_FA<br>ECT_Sensor_FA<br>IAT_SensorFA | | |
| | | | | | No Pending DTCs: | EGRValve_FP<br>ECT_Sensor_Ckt_FP<br>IAT_SensorCircuitFP | | |
| | | | | | Diagnostic is Enabled | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Mass Air Flow Sensor Circuit Low Frequency (Continental MAF) | P0102 | Detects a continuous short to ground in the MAF sensor circuit or a MAF sensorthat is outputting a frequency that is too low. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too low. A low MAF frequency is associated with a high engine air flow.<br><br>The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass airflow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function. | MAF Output | <= 850 Hertz<br>(>= 314.5 gm/sec) | Engine Run Time<br>Engine Speed<br>Powertrain Relay Voltage<br>Above criteria present for a period of time<br><br>Diagnostic is Enabled | > 0.0 seconds<br>>= 300 RPM<br>>= 9.1 Volts<br><br>>= 0.5 seconds | 400 failures out of 500 samples<br><br>1 sample every cylinder firing event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Mass Air Flow Sensor Circuit High Frequency (Continental MAF) | P0103 | Detects a MAF sensor that is outputting a frequency signal that is too high. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too high. A high MAF frequency is associated with a low engine air flow.<br><br>The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass airflow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function. | MAF Output | >= 7,000 Hertz<br>(<= 0.00 gm/sec) | Engine Run Time<br>Engine Speed<br>Powertrain Relay Voltage<br>Above criteria present for a period of time<br><br>Diagnostic is Enabled | > 0.0 seconds<br>>= 300 RPM<br>>= 9.1 Volts<br><br>>= 0.5 seconds | 400 failures out of 500 samples<br><br>1 sample every cylinder firing event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Manifold Absolute Pressure Sensor Performance (naturally aspirated) | P0106 | Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range.<br><br>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor and Throttle Position sensor (TPS).<br><br>These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAP sensor. In this case, the MAP Performance diagnostic will fail. | Filtered Throttle Model Error<br>AND<br>ABS(Measured M A P - MAP Model 1) Filtered<br>AND<br>ABS(Measured M A P - MAP Model 2) Filtered | <= 250 kPa*(g/s)<br><br>> 22.0 kPa<br><br>> 22.0 kPa | Engine Speed<br>Engine Speed<br><br>(Coolant Temp<br>OR<br>OBD Coolant Enable Criteria<br><br>(Coolant Temp<br>OR<br>OBD Max Coolant Achieved<br><br>Intake Air Temp<br>Intake Air Temp<br><br>Minimum total weight factor (all factors multiplied together)<br><br>See Residual Weight Factor tables. | >= 0 RPM<br><= 5,400 RPM<br><br>>= -9 Deg C<br><br>= TRUE)<br><br><= 130 Deg C<br><br>= FALSE)<br><br>-20 Deg C<br><= 129 Deg C<br><br>>= 0.50<br><br>Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**<br><br>MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM**<br><br>MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** | Continuous<br><br>Calculations are performed every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | No Active DTCs:<br><br>No Pending DTCs:<br><br>Diagnostic is Enabled | MAP_SensorCircuitFA<br>EGRValvePerformance_F<br>A<br>MAF_SensorCircuitFA<br>CrankSensor_FA<br>ECT_Sensor_FA<br>IAT_SensorFA<br><br>EGRValve_FP<br>ECT_Sensor_Ckt_FP<br>IAT_SensorCircuitFP | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Manifold Absolute Pressure Sensor Circuit Low | P0107 | Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. | MAP Voltage | < 3.0 % of 5 Volt Range<br>(This is equal to 6.1 kPa) | Diagnostic is Enabled | | 320 failures out of 400 samples<br><br>1 sample every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Manifold Absolute Pressure Sensor Circuit High | P0108 | Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. | MAP Voltage | > 90.0% of 5 Volt Range<br>(This is equal to 115.1 kPa) | Diagnostic is Enabled | | 320 failures out of 400 samples<br><br>1 sample every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor, but no manifold temperature sensor) | P0111 | Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and coolant temperature sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and coolant temperature values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled.<br><br>The diagnostic will fail if the IAT2 and coolant temperature values are similar, and the IAT value is not similar to the IAT2 and coolant temperature values.<br><br>This diagnostic is executed once per ignition cycle if the enable conditions are met. | ABS(Power Up IAT-Power Up IAT2)<br><br>AND<br><br>ABS(Power Up ECT-Power Up IAT)> ABS(Power Up ECT-Power Up IAT2) | > 25 deg C | Diagnostic is Enabled<br><br>Time between current ignition cycle and the last time the engine was running<br><br>Powertrain Relay Voltage for a time<br><br>No Active DTCs:<br><br>LIN communications established with MAF | <br><br><br><br>> 28,800 seconds<br><br>>= 11.0 Volts<br>>= 0.9 seconds<br><br>PowertrainRelayFault<br>ECT_Sensor_Ckt_FA<br>IAT_SensorCircuitFA<br>HumTempSnsrCktFA<br>EngineModeNotRunTimer Error | Executes once at the beginning of each ignition cycle if enable conditions are met | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Circuit Low (applications with LIN MAF) | P0112 | Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too low.<br><br>The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | IAT Temperature | < -60 degrees C | Diagnostic is Enabled<br><br>LIN Communications established with MAF | | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Circuit High (applications with LIN MAF) | P0113 | Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too high.<br><br>The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | IAT Temperature | > 150 degrees C | Diagnostic is Enabled<br><br>LIN Communications established with MAF | | 40 failures out of 50 samples<br><br>1 sample every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Air Temperature Sensor Intermittent In-Range | P0114 | Detects a noisy or erratic signal in the Intake Air Temperature (IAT) circuit by monitoring the IAT sensor and failing the diagnostic when the IAT signal has a noisier output than is expected.<br><br>When the value of the IATsignal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT readings. The result of this summation is called a “string length”.<br><br>Since the IAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous) | > 80.00 deg C<br><br>10 consecutive IAT readings | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Coolant Temperature Sensor Not Plausible (Non-ATM) | P0116 | This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition. | This sensor is compared to two other sensors for this diagnostic to function.<br><br>This program uses a highly confiurable sensor reading system.<br><br>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl<br><br>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl<br><br>Temperature Sensor 2: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 3: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 4: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 5: CeEECR_e_NollseAssg nmnt<br><br>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) | | Diagnostic is Enabled<br><br>No Active DTC's<br><br>Propulsion system Inactive timer error<br><br>Sensor under diagnosis is not faulted<br><br>Used comparison sensors are not currently faulted:<br>- BiasChkCylHdCIntSnsr<br>- BiasChkBlockCIntSnsr<br>- BiasChkEngInCIntSnsr<br>- BiasChkEngOutCIntSnsr<br>- BiasChkHtrCrInCIntSnsr<br>- BiasChkHtrCrOutCInSnsr<br>- BiasChkRadOutCIntSnsr<br>- BiasChkBypInCIntSnsr<br>- BiasChkEngMetalSnsr<br>- BiasChkIntakeAirSnsr<br>- BiasChkHumTmpSnsr<br>- BiasChkManfldAirSnsr<br>- BiasChkOutsideAirSnsr<br>- BiasChkEngOilSnsr<br>- BiasChk_EGR_UpStrmSn | OAT_PtEstFiltFA<br>PSAR_PropSyslnactveCr s_FA<br><br>= FALSE<br><br>EECR_EngineOutlet_Ckt FA<br><br>EECR_CylHeadCoolant_ CktFA<br>EECR_BlockCoolant_Ckt FA<br>EECR_Enginelnlet_CktFA<br><br>EECR_EngineOutlet_Ckt FA<br>EECR_HeaterCorelnlet_C ktFA<br><br>EECR_HeaterCoreOutlet _CktFA<br><br>EECR_RadiatorOutlet_Ck tFA<br>EECR_Bypasslnlet_CktF A<br>EECR_CylHeadMetal1_C ktFA<br>IAT_SensorFA<br>HumTempSnsrFA<br>MnfdTempSensorFA<br>OAT_AmbientSensorFA<br>EngOilTempFA | 1 failure to set DTC<br><br>1 sec/ sample<br><br>Once per valid cold start | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | sensor number.<br><br>**Auxilary Radiator Outlet 1:**<br>CeEECR_e_NoPhysAss gnmnt<br>Comparison sensor 1:<br>CeEECR_e_BiasChkNo Selection<br>Comparison sensor 2:<br>CeEECR_e_BiasChkNo Selection<br>Fuel Operated heater:<br>CeEECR_e_AuxHeaterN ©Effect<br>Block Heater:<br>CeEECR_e_AuxHeaterN ©Effect<br><br>Threshold A:<br>Threshold B:<br><br>**Auxilary Radiator Outlet 2:**<br>CeEECR_e_NoPhysAss gnmnt<br>Comparison sensor 1:<br>CeEECR_e_BiasChkNo Selection<br>Comparison sensor 2:<br>CeEECR_e_BiasChkNo Selection<br>Fuel Operated heater:<br>CeEECR_e_AuxHeaterN ©Effect<br>Block Heater:<br>CeEECR_e_AuxHeaterN ©Effect<br><br>Threshold A:<br>Threshold B: | <br><br><br><br><br><br><br><br><br><br><br><br><br><br>50.0 °C<br>15.0°C<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>50.0 °C<br>15.0°C | sr<br>-<br>BiasChk_EGR_DwnStmS nsr<br>-<br>BiasChk_EGR_LowPrsSn sr<br>- BiasChkFuelSnsr<br><br>Comparison sensors<br><br>==================<br>The following thresholds are based on the sensor under diagnosis<br><br>**Auxilary Radiator Outlet 1:**<br>Propulsion Off Soak Time<br>Ambient Air Temperature<br><br>**Auxilary Radiator Outlet 2:**<br>Propulsion Off Soak Time<br>Ambient Air Temperature<br><br>**Engine Outlet:**<br>Propulsion Off Soak Time<br>Ambient Air Temperature<br><br>**Head Metal:**<br>Propulsion Off Soak Time<br>Ambient Air Temperature<br><br>**Radiator Outlet:**<br>Propulsion Off Soak Time<br>Ambient Air Temperature<br><br>=================<br><br>Comoarison sensor 1 & 2 | EGRTempSensorllPSS_F A<br><br>EGRTempSensorDNSS_F A<br><br>LPE_TempSnsrFA<br>HRTR_b_FuelSensor_FA _Bndl<br><br>= Availible<br><br><br><br><br><br>>28,800 seconds<br>>-9.0°C<br><br><br>>28,800 seconds<br>>-9.0°C<br><br>>21,600 seconds<br>>-9.0°C<br><br>>28,800 seconds<br>>-9.0°C<br><br>>28,800 seconds<br>>-9.0°C | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | **Engine Outlet:**<br>CeEECR_e_PhysSnsr1<br>Comparison sensor 1:<br>CeEECR_e_BiasChkFue lSnsr | | are not<br><br><br>=================<br>Aux Heat Detection | =<br>CeEECR_e_BiasChkNoS election | | |
| | | | Comparison sensor 2:<br>CeEECR_e_BiasChkEng OilSnsr<br>Fuel Operated heater:<br>CeEECR_e_AuxHeaterN | | Aux heat detection can only be enabled the following are met: | | | |
| | | | ©Effect<br>Block Heater:<br>CeEECR_e_AuxHeaterBi asHigh | | No Active DTCs | Same set as listed above and<br>EngineModeNotRunTimer Error<br>EngineModeNotRunTimer _FA<br>VehicleSpeedSensor_FA | | |
| | | | Threshold A:<br>Threshold B: | 50.0 °C<br>15.5 °C | | | | |
| | | | **Head Metal:**<br>CeEECR_e_NoPhysAss gnmnt<br>Comparison sensor 1: | | At power-up a warm sensor and cool sensor are compared | | | |
| | | | CeEECR_e_BiasChkNo Selection | | Warm sensor | CeAEHR_e_BlkHtrEngO utClntSnsr | | |
| | | | Comparison sensor 2:<br>CeEECR_e_BiasChkNo Selection | | Cool sensor | CeAEHR_e_BlkHtrIntake AirSnsr | | |
| | | | Fuel Operated heater:<br>CeEECR_e_AuxHeaterN ©Effect<br>Block Heater: | | If the warm sensor is compared to the cool sensor | >10.00°C | | |
| | | | CeEECR_e_AuxHeaterN ©Effect | | Propulsion Off Soak Time<br>Engine Off Soak Time<br>Ambient Air Temperature | >21,590 seconds<br>>21,590 seconds<br>>-9.00°C | | |
| | | | Threshold A:<br>Threshold B: | 50.0 °C<br>15.0°C | There are 4 different types of aux heater detection for this application: | | | |
| | | | **Radiator Outlet:**<br>CeEECR_e_NoPhysAss gnmnt | | | | | |
| | | | Comparison sensor 1: | | 2x2 signature<br>Absolute Droo | Disabled<br>Disabled | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | CeEECR_e_BiasChkNo Selection<br>Comparison sensor 2:<br>CeEECR_e_BiasChkNo Selection<br>Fuel Operated heater:<br>CeEECR_e_AuxHeaterN©Effect<br>Block Heater:<br>CeEECR_e_AuxHeaterN©Effect<br>Threshold A:<br>Threshold B:<br><br>A failure will be reported if any of the following conditions are met. Evaluated in order:<br><br>1) This sensor is above both comparison sensors<br><br>2) This sensor is below both comparison sensors<br><br>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew<br><br>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew | 50.00 °C<br>15.00°C<br><br>>A°C<br><br>>A°C<br><br>>B°C<br><br>>B°C | IAT Drop<br>Temperature Derivative<br><br>**2x2 Signature Criteria:**<br><br>The warm sensors<br>Sensor 1:<br><br>Sensor 2:<br><br>The cool sensors<br>Sensor 1:<br><br>Sensor 2:<br><br>A block heater will be detected if the warm sensors are within<br>AND<br>The cool sensors are within<br>AND<br>The delta between the two groups (warm/cold)<br><br>**Absolute Drop Criteria:**<br><br>The<br>is monitored for a drop.<br><br>The drop will be monitored for once coolant flow is<br>AND<br>Flow time is between<br>AND either<br>Engine runtime is<br>OR<br>Insufficent coolant flow is present for | Disabled<br>Enabled<br><br>CeAEHR_e_BlkHtrCylHdClntSnsr<br>CeAEHR_e_BlkHtrEngOutCIntSnsr<br><br>CeAEHR_e_BlkHtrOutsideAirSnsr<br>CeAEHR_e_BlkHtrIntakeAirSnsr<br><br>5.0°C<br><br>5.0°C<br><br>>10.0°C<br><br>CeAEHR_e_BlkHtrEngOutCIntSnsr<br><br>>0.00L/min<br><br>0.0 -60.0 seconds<br><br>< 120.0 seconds<br><br>>300.0 seconds | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | A block heater is detected if a drop is | >5.0°C | | |
| | | | | | **IAT Drop Criteria:** | | | |
| | | | | | The sensor will be used as IAT for this method | CeAEHR_e_BlkHtrIntakeAirSnsr | | |
| | | | | | A block heater will be detected if: | | | |
| | | | | | IAT has a drop of during a drive defined by: | >5.0°C | | |
| | | | | | Drive time | >400.0 seconds | | |
| | | | | | Vehicle speed | >24.0kph | | |
| | | | | | Addtional drive time is provided when vehicle speed drops below above threshold as follows | 0.5 times the seconds with vehicle speed below the threshold above | | |
| | | | | | This detection method will abort if the engine is off | > 180.0 seconds | | |
| | | | | | OR | | | |
| | | | | | Engine runtime | > 1,800 seconds | | |
| | | | | | **Temperature Derivative Criteria:** | | | |
| | | | | | Derivative will be monitored using | CeAEHR_e_BlkHtrEngOutCIntSnsr | | |
| | | | | | Derivative will be monitored once coolant flow is | >-1.00 L/min | | |
| | | | | | AND | | | |
| | | | | | Flow time is between | 1.0- 18.0 seconds | | |
| | | | | | AND either | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Engine runtime is<br>OR<br>Insufficent coolant flow is present for<br><br>Derivative count will increment if derivative is<br><br>If counts are<br>a block heater is detected<br>========== | < 78.0 seconds<br><br>>300.0 seconds<br><br><-0.10°C/sec<br><br>> 2 counts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Coolant Temp Sensor Circuit Low (Non-ATM) | P0117 | Circuit Continuity<br>This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set. | ECT Resistance (@ 150°C)<br><br>This program uses a highly confiurable sensor reading system.<br><br>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl<br><br>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl<br><br>Temperature Sensor 2: CeEECR_e_NoUseAssg nmnt<br><br>Temperature Sensor 3: CeEECR_e_NoUseAssg nmnt<br><br>Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt<br><br>Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt | < X Ohms<br><br>X is equal to:<br>Temp Sensor 1: 55 Ohms<br><br>Temp Sensor 2: 55.0 Ohms<br><br>Temp Sensor 3: 55.0 Ohms<br><br>Temp Sensor 4: 55.0 Ohms<br><br>Temp Sensor 5: 55.0 Ohms | Diagnostic is Enabled | | 5 seconds out of a 6 seconds window<br><br>Continuously sampled | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Coolant Temp Sensor Circuit High (Non-ATM) | P0118 | Circuit Continuity<br>This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set. | ECT Resistance (@ -60°C)<br><br>This program uses a highly confiurable sensor reading system.<br><br>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl<br><br>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl<br><br>Temperature Sensor 2: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 3: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 4: CeEECR_e_NollseAssg nmnt<br><br>Temperature Sensor 5: CeEECR_e_NollseAssg nmnt | > X Ohms<br><br>X is equal to:<br>Temp Sensor 1: 175,000 Ohms<br><br>Temp Sensor 2: 175,000 Ohms<br><br>Temp Sensor 3: 175,000 Ohms<br><br>Temp Sensor 4: 175,000 Ohms<br><br>Temp Sensor 5: 175,000 Ohms | Diagnostic is Enabled<br><br>Engine run time<br>OR<br>IATmin | <br><br>> 10.0 seconds<br><br>> -20.0 °C | 5 seconds out of a 6 seconds window<br><br>Continuously sampled | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Coolant Temperature (ECT) Sensor Circuit Intermittent (Non-ATM) | P0119 | Circuit Erratic<br>This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set. | Temperature step change:<br><br>1) postive step change is greater than calculated high limit<br><br>OR<br><br>2) negitive step change is lower than calculated low limit.<br><br>This program uses a highly confiurable sensor reading system.<br><br>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl<br><br>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl<br>Temperature Sensor 2: CeEECR_e_NollseAssg nmnt<br>Temperature Sensor 3: CeEECR_e_NollseAssg nmnt<br>Temperature Sensor 4: CeEECR_e_NollseAssg nmnt<br>Temperature Sensor 5: CeEECR_e_NollseAssg nmnt<br><br>The calculated high and low limits for the next reading use the following calibrations: | | Diagnostic is Enabled<br><br>No Active DTC's | ECT_Sensor_Ckt_FA<br>EECR_EngineOut_Erratic _TFTKO | 5 seconds out of a 6 seconds window<br><br>Continuously sampled | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Temperature Sensor 1:<br><br>1) Sensor time constant<br>2) Sensor low limit<br>3) Sensor high limit<br><br>Temperature Sensor 2:<br><br>1) Sensor time constant<br>2) Sensor low limit<br>3) Sensor high limit<br><br>Temperature Sensor 3:<br><br>1) Sensor time constant<br>2) Sensor low limit<br>3) Sensor high limit<br><br>Temperature Sensor 4:<br><br>1) Sensor time constant<br>2) Sensor low limit<br>3) Sensor high limit<br><br>Temperature Sensor 5:<br><br>1) Sensor time constant<br>2) Sensor low limit<br>3) Sensor high limit<br><br>*****Generic Example*****<br><br>If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the | <br><br>7.4 seconds<br>-60.0 °C<br>200.0 °C<br><br><br><br>7.4 seconds<br>-60.0 °C<br>200.0 °C<br><br><br><br>7.4 seconds<br>-60.0 °C<br>200.0 °C<br><br><br><br>7.4 seconds<br>-60.0 °C<br>200.0 °C<br><br><br><br>7.4 seconds<br>-60.0 °C<br>200.0 °C | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | caluculated limits are 101 °C and 73 °C.<br><br>The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.<br>********** | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Throttle Position Sensor Performance (naturally aspirated) | P0121 | Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range.<br><br>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Mass Air Flow (MAF) sensor.<br><br>These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS Performance diagnostic will fail. | Filtered Throttle Model Error<br>AND<br>ABS(Measured M A P - MAP Model 2) Filtered | > 250 kPa*(g/s)<br><br><= 22.0 kPa | Engine Speed<br>Engine Speed<br><br>(Coolant Temp<br>OR<br>OBD Coolant Enable Criteria<br><br>(Coolant Temp<br>OR<br>OBD Max Coolant Achieved<br><br>Intake Air Temp<br>Intake Air Temp<br><br>Minimum total weight factor (all factors multiplied together)<br><br>See Residual Weight Factor tables.<br><br>No Active DTCs: | >= 0 RPM<br><= 5,400 RPM<br><br>>= -9 Deg C<br><br>= TRUE)<br><br><= 130 Deg C<br><br>= FALSE)<br><br>-20 Deg C<br><= 129 Deg C<br><br>>= 0.50<br><br>Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**<br><br>MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM**<br><br>MAP_SensorCircuitFA<br>EGRValvePerformance_FA<br>MAF_SensorCircuitFA<br>CrankSensor_FA<br>ECT_Sensor_FA<br>IAT_SensorFA | Continuous<br><br>Calculation are performed every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | No Pending DTCs:<br><br>Diagnostic is Enabled | EGRValve_FP<br>ECT_Sensor_Ckt_FP<br>IAT_SensorCircuitFP | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| TPS1 Circuit Low | P0122 | Detects a continuous or intermittent short low or open in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough. | TPS1 % Vref <<br><br>(100% corresponds to 5.0 Volt) | 6.50% Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 79/159 counts;<br><br>57 counts continuous;<br><br>3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| TPS1 Circuit High | P0123 | Detects a continuous or intermittent short high in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough. | TPS1 % Vref ><br><br>(100% corresponds to 5.0 Volt) | 95.00 % Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 79/159 counts;<br><br>57 counts continuous;<br><br>3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Coolant Temperature Below Stat Regulating Temperature | P0128 | This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault. | Energy is accumulated after the first conbustion event using Range 1, 2 or 3:<br><br>If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated.<br><br>**Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C<br><br>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 11.1 °C. The target temperature for this range will not drop below 79.9 °C<br><br>**Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0 °C<br><br>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 26.0 °C. The target temperature for this range will not drop below 26.0 ° | **P0128 Maximum Acculated Energy - Primary**<br><br>**P0128 Maximum Acculated Energy - Secondary** | Diagnostic is Enabled<br><br>No DTCs<br><br>Engine soak time<br>Engine run time<br>Engine Outlet Coolant Temperature<br>- Range 1:<br>- Range 2:<br>- Range 3:<br><br>Devices in main cooling circuit are not in in device control<br><br>If Engine RPM is continuously greater than for this time period<br><br>Distance traveled | THMR_AWP_AuxPumpFA<br>THMR_AHV_FA<br>THMR_SWP_Control_FA<br>THMR_SWP_Flow8tuckOn_FA<br>THMR_SWP_NoFlow_FA<br>OAT_PtEstFiltFA<br>VehicleSpeedSensor_FA<br>EngineTorqueEstlnaccurate<br>MAF_SensorFA<br>ETHR_CoolantEnergyModel<br>ETHR_RemedialActionLeveil<br>ETHR_RemedialActionLevel2<br>ETHR_RemedialActionLevel3<br>EECR_EngineOutlet_FA<br><br>> 1,800.0 seconds<br>30.0 - 1,470.0 seconds<br><br><60.5°C<br><45.6°C<br><45.6°C<br><br>8,192 rpm<br>5.0 seconds<br><br>> 1.2 km | 1 failure to set DTC<br><br>1 sec/ sample<br><br>Once per ignition key cycle | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | C<br><br>**Range 3 (Tertiary):**<br>Ambient air temperature is between -9.0 and -9.0 ° C<br><br>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 26.0 °C. The target temperature for this range will not drop below 26.0 ° C | **P0128 Maximum Acculated Energy - Tertiary**<br><br>This diagnostic models the net energy into and out of the cooling system during the warm-up process.<br><br>The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop. | The diagnostic will abort if the temperature has dropped by<br>after the customer has commanded the engine off | >5.0°C | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit Low Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM | P0131 | This DTC determines if the WRAF 02 sensor signal circuit is shorted low. This DTC will detect a short to ground fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuits. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters. | B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:<br><br>A) Pump Current - short to ground fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.<br><br>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).<br><br><u>Note:</u> A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC. | The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is < 150mV.<br><br>Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B1S1 DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete).<br>********** | P0135, P0030, P0031 or P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |
| | | | B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals: | The ASIC provides a fault indication when the pump current, reference cell, reference ground or | Diagnostic is Enabled<br><br>B1S1 DTC's Not active this key cycle | P0135, P0030, P0031 or P0032 | Signal A: 20 failures out of 24 samples<br><br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | A) Pump Current - short to ground fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.<br><br>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | trim circuit fails the following criteria;<br><br>\|Nernst signal - 0.45\| >1.0 volts<br><br>OR<br><br>\|Voltage drop over Rgnd - (internal current source *Rgnd)\| >0.5 volts<br><br>OR<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for previous 10 milli - seconds to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | = Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit High Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM | P0132 | This DTC determines if the WRAF 02 sensor signal circuit is shorted high. This DTC will detect a short to power fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuit. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters. | B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:<br><br>A) Pump Current - short to power fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to power fail counts are accumulated to determine fault status.<br><br>D) Trim Circuit - short to power fail counts are accumulated to determine fault status<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).. | The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is > 5.2V.<br><br>Note: the faults must exist for more than 100 msec to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B1S1 DTC's Not active this key cycle<br><br>Measure Valid Status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete).<br>********** | <br><br>P0135, P0030, P0031 or P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Frequency: Continuous in 25 milli - second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:<br><br>A) Pump Current - short to power fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to power fail counts are accumulated to determine fault status.<br><br>D) Trim Circuit - short to power fail counts are accumulated to determine fault status<br><br><u>Note:</u> This ASIC is referred to as CJ136 (next Gen of CJ135 from Bosch). | The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin fail the following criteria;<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B1S1 DTC's Not active this key cycle<br><br>Measure Valid Status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay<br>Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>P0135, P0030, P0031 or P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Frequency: Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Performance Bank 1 Sensor 1 | P0135 | This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.<br><br>The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters. | Heater Current outside of the expected range of | 0.3 < Amps < 3.1 | Diagnostic is Enabled<br><br>No Active DTC's<br><br>System Voltage<br>Heater Warm-up delay<br>02S Heater device control<br><br>B1S1 O2S Heater Duty Cycle<br><br>All of the above met for | <br><br>ECT_Sensor_FA<br><br>>10.5 Volts<br>= Complete<br><br>= Not active<br><br>> zero<br><br>>120 seconds | /failures out of 9 samples<br><br>Frequency:<br>1 tests per trip<br>5 seconds delay between tests and 1 second execution rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit Low Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only | P0137 | This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.<br><br>The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters. | Oxygen Sensor Signal | < 50 mvolts | Diagnostic is Enabled<br><br>No Active DTC's<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>AIR intrusive test<br>Fuel intrusive test<br>Idle intrusive test<br>EGR intrusive test<br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Commanded Equivalence Ratio<br>Air Per Cylinder<br>Fuel Control State<br>Closed Loop Active | <br><br>TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>AIR System FA<br>Ethanol Composition Sensor FA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br><br>= Not active<br>= Not active<br>= Not active<br>= Not active<br>10.5 < Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active<br><br>= False<br><br>= False<br><br><br>0.990< ratio<1.014<br>150< mgrams <800<br>= Closed Loop<br>= TRUE<br>(Please see **"Closed Loop Enable** | 320 failures out of 400 samples<br><br>Frequency: Continuous in 100 milli-second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clarification"** in Supporting Tables). | | |
| | | | | | All Fuel Injectors for active Cylinders<br>Fuel Condition | Enabled (On)<br>Ethanol < 87 % | | |
| | | | | | Ethanol Estimation in Progress | = Not Active<br>(Please see **"Ethanol Estimation in Progress"** in Supporting Tables). | | |
| | | | | | Fuel State | DFCO not active | | |
| | | | | | All of the above met for | >5.0 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit High Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only | P0138 | This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.<br><br>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters. | Oxygen Sensor Signal | > 1,050 mvolts | Diagnostic is Enabled<br><br>No Active DTC's<br><br><br><br><br><br><br><br><br><br>System Voltage<br>AFM Status<br>Heater Warm-up delay<br>Engine Run Time<br>Engine Run Accum<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br>**********<br><br>Secondary delay after above conditions are complete (cold start condition)<br><br>Secondary delay after above conditions are complete (not cold start condition)<br><br>Commanded Equivalence Ratio<br>**********<br><br>All of the above met for | <br><br>TPS_ThrottleAuthorityDefaulted<br>MAF_SensorFA<br>MAP_SensorFA<br>EvapExcessPurgePsbl_FA<br>FuelInjectorCircuit_FA<br>Ethanol Composition Sensor FA<br>AIR System FA<br><br>10.5 < Volts<br>= All Cylinders active<br>= Complete<br>> 5.0 seconds<br>> 30.0 seconds<br><br>= False<br><br>= False<br>**********<br><br>> 10.0 seconds when engine soak time > 28,800 seconds<br><br>>5.0 seconds when engine soak time < 28,800 seconds<br><br>< 1.014 EQR<br>**********<br><br>> 2.0 seconds | 100 failures out of 125 samples<br><br>Frequency: Continuous in 100 milli-second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Slow Response Rich to Lean Bank 1 Sensor 2 | P013A | The P013A diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P013A diagnostic measures the secondary 02 sensor voltage response rate | Primary Method: The EWMAofthe Post 02 sensor normalized integral value.<br>The EWMA repass limit is The EWMA calculation uses a 0.28 coefficient.<br><br>OR<br><br>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) | > 8.0 units<br>< 7.5 units<br><br>> 70.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts) | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013B, P013E, P013F, P2270 or P2271<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. Airflow accumulation is | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Ais set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br>Secondary method: | | | Low Fuel Condition<br>Only when FuelLevelDataFault<br><br>Post fuel cell<br><br>Crankshaft Torque<br><br>DTC's Passed<br><br>==========<br>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input). | only enabled when airflow is above 22.0 grams/sec.<br><br>= False<br><br>= False<br><br>= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.<br><125.0Nm<br><br>P2270 (and P2272 if applicable)<br>P013E (and P014A if applicable)<br><br>========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Slow Response Lean to Rich Bank 1 Sensor 2 | P013B | The P013B diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.<br><br>Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P013B diagnostic measures the secondary 02 sensor voltage response rate | Primary Method: The EWMAofthe Post 02 sensor normalized integral value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.28 coefficient.<br><br>OR<br><br>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) | > 8.0 units<br>< 7.5 units<br><br>> 200 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts) | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuelInjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013A, P013E, P013F, P2270 or P2271<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Bis set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br>Secondary method: | | | Green Cat System Condition<br><br>Low Fuel Condition Only when FuelLevelDataFault<br><br>Post fuel cell<br><br>DTC's Passed<br><br>==========<br>After above conditions are met: Fuel Enrich mode continued. | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>= Not Valid,<br>Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec.<br>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).<br><br>= False<br><br>= False<br><br>= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.<br><br>P2270<br>P013E<br>P013A<br>P2271<br>P013F<br><br>========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached. | | | ==========<br>During this test the following must stay TRUE or the test will abort:<br>0.951 < Base Commanded EQR < 1.100<br><br>==========<br>During this test: Engine Airflow must stay below:<br><br>and the delta Engine Airflow over 12.5msec must be : | ==========<br><br>==========<br>100 gps<br><br>< 100.0 gps | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Slow Response Rich to Lean Bank 2 Sensor 2 | P013C | The P013C diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P013C diagnostic measures the secondary 02 sensor voltage response rate | Primary Method: The EWMAofthe Post 02 sensor normalized integral value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.28 coefficient.<br><br>OR<br><br>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) | > 8.0 units<br>< 7.5 units<br><br>>70.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts) | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013D, P014A, P014B, P2272 or P2273<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Cis set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br>Secondary method: | | | Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Post fuel cell<br><br>Crankshaft Torque<br><br>DTC's Passed<br><br>==========<br>After above conditions are met:<br>DFCO mode is continued (wo driver initiated pedal input). | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>= False<br><br>= False<br><br>= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.<br><125.0Nm<br><br>P2272<br>P014A<br><br>========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Slow Response Lean to Rich Bank 2 Sensor 2 | P013D | The P013D diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.<br><br>Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P013D diagnostic measures the secondary 02 sensor voltage response rate | Primary Method: The EWMAofthe Post 02 sensor normalized integral value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.28 coefficient.<br><br>OR<br><br>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) | > 8.0 units<br>< 7.5 units<br><br>> 200 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts) | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013C, P014A, P014B, P2272 or P2273<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Dis set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br>Secondary method: | | | Green Cat System Condition<br><br>Low Fuel Condition Only when FuelLevelDataFault<br><br>Post fuel cell<br><br>DTC's Passed<br><br>==========<br>After above conditions are met: Fuel Enrich mode continued. | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>= Not Valid,<br>Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec.<br>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).<br><br>= False<br><br>= False<br><br>= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.<br><br>P2272<br>P014A<br>P013C<br>P2273<br>P014B<br><br>========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached. | | | ==========<br>During this test the following must stay TRUE or the test will abort:<br>0.951 < Base Commanded EQR < 1.100<br><br>==========<br>During this test: Engine Airflow must stay below:<br><br>and the delta Engine Airflow over 12.5msec must be : | ==========<br><br>==========<br>100 gps<br><br>< 100.0 gps | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2 | P013E | The P013E diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached. | Post 02 sensor voltage<br><br>AND<br><br>The Accumulated mass airflow monitored during the Delayed Response Test under DFCO<br><br>DFCO begins after:<br>1) Catalyst has been rich for a minimum of<br>AND<br>2) Catalyst Rich Accumulation Air Flow is | > 450 mvolts<br><br>>60 grams<br><br>> 1 secs<br><br>>20.0 grams | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuelInjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013A, P013B, P013F, P2270 or P2271<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | Crankshaft Torque | <125.0Nm | | |
| | | | | | DTC's Passed | P2270 | | |
| | | | | | Number of fueled cylinders | < 7 cylinders | | |
| | | | | | ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input). | ========== | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2 | P013F | The P013F diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass airflow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached. | Post 02 sensor voltage<br><br>AND<br><br>The Accumulated mass airflow monitored during the Delayed Response Test | < 350 mvolts<br><br>>400 grams | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013A, P013B, P013E, P2270 or P2271<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Green Cat System Condition | = Not Valid,<br>Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec.<br>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service). | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | DTC's Passed | P2270<br>P013E<br>P013A<br>P2271 | | |
| | | | | | Number of fueled cylinders | > 1 cylinders | | |
| | | | | | ==========<br>After above conditions are met: Fuel Enrich mode | ========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | entered.<br><br>==========<br>During this test the following must stay TRUE or the test will abort:<br>0.951 < Base Commanded EQR < 1.100<br><br>==========<br>During this test: Engine Airflow must stay below:<br><br>and the delta Engine Airflow over 12.5msec must be : | ==========<br><br>==========<br><br>100 gps<br><br>< 100.0 gps | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Performance Bank 1 Sensor 2) (For Dual Bank Exhaust Only | P0141 | This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.<br><br>The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters. | Heater Current outside of the expected range of | 0.3 > amps > 2.9 | Diagnostic is Enabled<br><br>No Active DTC's<br>System Voltage<br>Heater Warm-up delay<br>02S Heater device control<br>B1S1 02S Heater Duty Cycle<br><br>All of the above met for | ECT_Sensor_FA<br>>10.5 Volts<br>= Complete<br><br>= Not active<br><br>> zero<br><br>>120 seconds | /failures out of 9 samples<br><br>Frequency:<br>1 tests per trip<br>5 seconds delay between tests and 1 second execution rate. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2 | P014A | The P014A diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached. | Post 02 sensor voltage<br><br>AND<br><br>The Accumulated mass airflow monitored during the Delayed Response Test under DFCO<br><br>DFCO begins after:<br>1) Catalyst has been rich for a minimum of<br>AND<br>2) Catalyst Rich Accumulation Air Flow is | > 450 mvolts<br><br>>60 grams<br><br>> 1 secs<br><br>> 20.0 grams | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green O2S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuelInjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>O2S_Bank_ 1_TFTKO<br>O2S_Bank_ 2_TFTKO<br><br>P013C, P013D, P014B, P2272 or P2273<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | Crankshaft Torque | <125.0Nm | | |
| | | | | | DTC's Passed | P2272 | | |
| | | | | | Number of fueled cylinders | < 7 cylinders | | |
| | | | | | ========== | ========== | | |
| | | | | | After above conditions are met: DFCO mode entered (wo driver initiated pedal input). | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2 | P014B | The P014B diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass airflow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached. | Post 02 sensor<br><br>AND<br><br>The Accumulated mass airflow monitored during the Delayed Response Test | < 350mvolts<br><br>> 400 grams. | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>02S_Bank_ 1_TFTK0<br>02S_Bank_ 2_TFTK0<br><br>P013C, P013D, P014A, P2272 or P2273<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Green Cat System Condition | = Not Valid,<br>Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec.<br>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service). | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | DTC's Passed | P2272<br>P014A<br>P013C<br>P2273 | | |
| | | | | | Number of fueled cylinders | > 1 cylinders | | |
| | | | | | ==========<br>After above conditions are met: Fuel Enrich mode | ========== | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | entered.<br><br>==========<br>During this test the following must stay TRUE or the test will abort:<br>0.951 < Base Commanded EQR < 1.100<br><br>==========<br>During this test: Engine Airflow must stay below:<br><br>and the delta Engine Airflow over 12.5msec must be : | <br><br>==========<br><br><br><br><br><br>==========<br><br>100 gps<br><br><br><br>< 100.0 gps | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit Low Voltage Bank 2 Sensor 1 (For use with WRAF - Gen4 ECM | P0151 | This DTC determines if the WRAF 02 sensor signal circuit is shorted low. This DTC will detect a short to ground fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuits. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters. | B2S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:<br><br>A) Pump Current - short to ground fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.<br><br>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).<br><br><u>Note:</u> A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC. | The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is < 150mV.<br><br>Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B2S1 DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete).<br>********** | P0155, P0050, P0051 or P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |
| | | | B2S1 WRAF ASIC indicates a ground short to any of the following WRAF signals: | The ASIC provides a fault indication when the pump current, reference cell, reference ground or | Diagnostic is Enabled<br><br>B2S1 DTC's Not active this key cycle | P0155, P0050, P0051 or P0052 | Signal A: 20 failures out of 24 samples<br><br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | A) Pump Current - short to ground fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.<br><br>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | trim circuit fails the following criteria;<br><br>\|Nernst signal - 0.45\| >1.0 volts<br><br>OR<br><br>\|Voltage drop over Rgnd - (internal current source *Rgnd)\| >0.5 volts<br><br>OR<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for previous 10 milli - seconds to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | = Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit High Voltage Bank 2 Sensor 1 (For use with WRAF - Gen4 ECM | P0152 | This DTC determines if the WRAF 02 sensor signal circuit is shorted high. This DTC will detect a short to power fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuit. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters. | B2S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:<br><br>A) Pump Current - short to power fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to power fail counts are accumulated to determine fault status.<br><br>D) Trim Circuit - short to power fail counts are accumulated to determine fault status<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).. | The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is > 5.2V.<br><br>Note: the faults must exist for more than 100 msec to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B2S1 DTC's Not active this key cycle<br><br>Measure Valid Status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete).<br>********** | <br><br>P0155, P0050, P0051 or P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Frequency: Continuous in 25 milli - second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | B2S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:<br><br>A) Pump Current - short to power fail counts are accumulated to determine fault status.<br><br>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.<br><br>C) Reference Ground - short to power fail counts are accumulated to determine fault status.<br><br>D) Trim Circuit - short to power fail counts are accumulated to determine fault status<br><br><u>Note:</u> This ASIC is referred to as CJ136 (next Gen of CJ135 from Bosch). | The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin fail the following criteria;<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag.<br><br>The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>B2S1 DTC's Not active this key cycle<br><br>Measure Valid Status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay<br>Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>P0155, P0050, P0051 or P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | Signal A: 20 failures out of 24 samples<br><br>OR<br><br>Signal B: 20 failures out of 24 samples<br><br>OR<br><br>Signal C: 20 failures out of 24 samples<br><br>OR<br><br>Signal D: 20 failures out of 24 samples<br><br>Frequency: Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Performance Bank 2 Sensor 1 | P0155 | This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.<br><br>The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters. | Heater Current outside of the expected range of | 0.3 > amps > 3.1 | Diagnostic is Enabled<br><br>No Active DTC's<br>System Voltage<br>Heater Warm-up delay<br>02S Heater device control<br>B1S1 02S Heater Duty Cycle<br><br>All of the above met for | ECT_Sensor_FA<br>>10.5 Volts<br>= Complete<br><br>= Not active<br><br>> zero<br><br>> 120 seconds | /failures out of 9 samples<br><br>Frequency:<br>1 tests per trip<br>5 seconds delay between tests and 1 second execution rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit Low Voltage Bank 2 Sensor 2 | P0157 | This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.<br><br>The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters. | Oxygen Sensor Signal | < 50 mvolts | Diagnostic is Enabled<br><br>No Active DTC's<br><br>AIR intrusive test<br>Fuel intrusive test<br>Idle intrusive test<br>EGR intrusive test<br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Commanded Equivalence Ratio<br>Air Per Cylinder<br>Fuel Control State<br>Closed Loop Active | <br><br>TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>AIR System FA<br>Ethanol Composition Sensor FA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br><br>= Not active<br>= Not active<br>= Not active<br>= Not active<br>10.5 < Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active<br><br>= False<br><br>= False<br><br>0.990 < ratio < 1.014<br>150< mgrams < 800<br>= Closed Loop<br>= TRUE<br>(Please see **"Closed Loop Enable** | 320 failures out of400 samples<br><br>Frequency: Continuous in 100 milli-second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clarification"** in Supporting Tables). | | |
| | | | | | All Fuel Injectors for active Cylinders<br>Fuel Condition | Enabled (On)<br>< 87% Ethanol | | |
| | | | | | Ethanol Estimation in Progress | = Not Active<br>(Please see **"Ethanol Estimation in Progress"** in Supporting Tables). | | |
| | | | | | Fuel State | DFCO not active | | |
| | | | | | All of the above met for | > 5.0 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Circuit High Voltage Bank 2 Sensor 2 | P0158 | This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.<br><br>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters. | Oxygen Sensor Signal | > 1,050 mvolts | Diagnostic is Enabled<br><br>No Active DTC's<br><br>System Voltage<br>AFM Status<br>Heater Warm-up delay<br>Engine Run Time<br>Engine Run Accum<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br>**********<br><br>Secondary delay after above conditions are complete (cold start condition)<br><br>Secondary delay after above conditions are complete (not cold start condition)<br><br>Commanded Equivalence Ratio<br>**********<br><br>All of the above met for | <br><br>TPS_ThrottleAuthorityDefaulted<br>MAF_SensorFA<br>MAP_SensorFA<br>EvapExcessPurgePsbl_FA<br>FuelInjectorCircuit_FA<br>Ethanol Composition Sensor FA<br>AIR System FA<br><br>10.5 < Volts<br>= All Cylinders active<br>= Complete<br>> 5.0 seconds<br>> 30.0 seconds<br><br>= False<br><br>= False<br>**********<br><br>> 15.0 seconds when engine soak time > 28,800 seconds<br><br>> 8.0 seconds when engine soak time < 28,800 seconds<br><br>< 1.014 EQR<br>**********<br><br>> 2 seconds | 100 failures out of 125 samples<br><br>Frequency: Continuous in 100 milli-second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use with WRAF | P015A | DTC P015A detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P013E/P013A/ P2271), which commands fuel cut off.<br><br>Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from above to below the 02 measured EQR threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P015A diagnostic measures the primary WRAF 02 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro, | Primary method: The EWMAofthe Pre 02 sensor normalized R2L time delay value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.25 coefficient.<br>This method calculates the result when the WRAF 02 sensor measured EQR is<br><br>OR<br><br>Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test.<br><br>AND<br><br>Pre WRAF 02 sensor measured EQR is | > 0.69 EWMA (sec)<br>< 0.59 EWMA (sec)<br><br>< 0.900 EQR<br><br>> 3.5 Seconds<br><br>> 0.400 EQR | Diagnostic is Enabled<br><br>No Active DTC's<br><br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault | TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>MAF_SensorFA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br>AIR System FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EthanolCompositionSensor_FA<br>EngineMisfireDetected_FA<br>WRAF_Bank_1_FA<br>P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271<br><br>>10.5 Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active<br><br>= False<br><br>= False | Frequency: Once per trip<br>Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponselsActive = TRUE, multiple tests per trip are allowed | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015A is set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br><u>Secondary method:</u><br>This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR | | | Green 02S Condition<br><br>02 Heater (pre sensor) on for<br><br>Engine Coolant<br>( Or OBD Coolant Enable Criteria<br><br>IAT<br>Engine run Accum<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Engine Airflow<br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled)<br><br>Closed loop integral<br>Closed Loop Active | = Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tablestab.<br>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>> 40 seconds<br><br>> 50 °C<br><br>=TRUE)<br><br>> -40 °C<br>> 30 seconds<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>4.0 < gps < 20.0<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7<br><br>0.75 < C/L Int < 1.08<br>= TRUE<br>(Please see **"Closed Loon Enable** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | threshold before a delay time threshold is reached. | | | Evap<br><br>Ethanol Estimation in Progress<br><br>Baro<br>Post fuel cell<br><br>EGR Intrusive diagnostic<br>All post sensor heater delays<br>O2S Heater (post sensor) on Time<br>Predicted Catalyst temp<br>Fuel State<br><br>==========<br>All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.<br>==========<br><br>Pre O2S EQRB1S1 at end of Cat Rich stage<br>Fuel State<br>Number of fueled cylinders<br><br>==========<br>After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input). | **Clarification"** in Supporting Tables), not in control of purge<br><br>= Not Active<br>(Please see **"Ethanol Estimation in Progress"** in Supporting Tables).<br><br>> 70kpa<br>= enabled<br><br>= not active<br><br>= not active<br><br>> 60.0 sec<br>550 < °C < 850<br>= DFCO possible<br><br>==========<br><br>==========<br><br>> 1.150EQR<br>= DFCO active<br><br>< 7 cylinders<br><br>========== | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use with WRAF | P015B | DTC P015B detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment.<br><br>Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from lean condition to above the 02 measured EQR threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P015B diagnostic measures the primary WRAF 02 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro, and intake air temperature resulting in | Primary method: The EWMAofthe Pre 02 sensor normalized L2R time delay value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.25 coefficient.<br><br>OR<br><br>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.<br><br>AND<br><br>Pre WRAF 02 sensor measured EQR is<br><br>OR<br><br>At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is | > 0.73 EWMA (sec)<br>< 0.63 EWMA (sec)<br><br>> 2.5 Seconds<br><br>< 0.900 EQR<br><br>< 1.150EQR | Diagnostic is Enabled<br><br>No Active DTC's<br><br>P015Atest is complete and<br><br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control | TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>MAF_SensorFA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br>AIR System FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EthanolCompositionSensor_FA<br>EngineMisfireDetected_FA<br>WRAF_Bank_1_FA<br>P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271<br><br>= Passed<br><br>>10.5 Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active | Frequency: Once per trip<br>Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponselsActive = TRUE, multiple tests per trip are allowed | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br><u>Secondary method:</u><br>This fault is set if the primary WRAF 02 sensor does not achieve the required higher measured EQR threshold before a delaytime threshold is | | | Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Green 02S Condition<br><br>02 Heater (pre sensor) on for<br><br>Engine Coolant<br>( Or OBD Coolant Enable Criteria<br><br>IAT<br>Engine run Accum<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Engine Airflow<br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled) | = False<br><br>= False<br><br>= Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tablestab.<br>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>> 40 seconds<br><br>> 50 °C<br><br>=TRUE)<br><br>> -40 °C<br>> 30 seconds<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>4.0 < gps < 20.0<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | reached. | | | Closed loop integral<br>Closed Loop Active<br><br><br><br><br><br>Evap<br><br>Ethanol Estimation in Progress<br><br><br><br>Baro<br>Post fuel cell<br>EGR Intrusive diagnostic<br>All post sensor heater delays<br>O2S Heater (post sensor) on time<br><br>Predicted Catalyst temp<br>Fuel State<br>Number of fueled cylinders<br><br>==========<br>When above conditions are met: Fuel Enrich mode is entered.<br><br>==========<br><br>During this test: Engine Airflow must stay between:<br>and the delta Engine Airflow over 12.5msec must be : | 0.75 < C/L Int < 1.08<br>= TRUE<br>(Please see **"Closed Loop Enable Clarification"** in Supporting Tables).<br><br>not in control of purge<br><br>= Not Active<br>(Please see **"Ethanol Estimation in Progress"** in Supporting Tables).<br><br>> 70kpa<br>= enabled<br>= not active<br><br>= not active<br><br>> 60.0 sec<br><br>550 < °C < 850<br>= DFCO inhibit<br><br>> 1 cylinders<br><br>==========<br><br><br><br>==========<br><br><br>4 < gps < 20<br><br><br>< 100.0 gps | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1) (For use with WRAF | P015C | DTC P015C detects that the primary WRAF oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P014A/ P013CZ P2273), which commands fuel cut off.<br><br>Note: The Primary method is used when the WRAF 02 sensor signal transitions from above to below the 02 measured EQR threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P015C diagnostic measures the primary WRAF 02 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro, and intake air | Primary method: The EWMAofthe Pre 02 sensor normalized R2L time delay value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.25 coefficient.<br>This method calculates the result when the WRAF 02 sensor measured EQR is<br><br>OR<br><br>Secondary method: The Accumulated time monitored during the R2L Delayed Response Test.<br><br>AND<br><br>Pre WRAF 02 sensor measured EQR is above | > 0.69 EWMA (sec)<br>< 0.59 EWMA (sec)<br><br>< 0.9 EQR<br><br>> 3.5 Seconds<br><br>> 0.400 EQR | Diagnostic is Enabled<br><br>No Active DTC's<br><br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control<br><br>Low Fuel Condition<br>Only when<br>FuelLevelDataFault | TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>MAF_SensorFA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br>AIR System FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EthanolCompositionSensor_FA<br>EngineMisfireDetected_FA<br>WRAF_Bank_2_FA<br>P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273<br><br>>10.5 Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active<br><br>= False<br><br>= False | Frequency: Once per trip<br>Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponselsActive = TRUE, multiple tests per trip are allowed | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015C is set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br><u>Secondary method:</u><br>This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR threshold before a | | | Green 02S Condition<br><br>02 Heater (pre sensor) on for<br><br>Engine Coolant<br>( Or OBD Coolant Enable Criteria<br><br>IAT<br>Engine run Accum<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Engine Airflow<br><br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled)<br><br>Closed loop integral<br>Closed Loop Active | = Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tablestab.<br>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>> 40 seconds<br><br>> 50 °C<br><br>=TRUE)<br><br>> -40 °C<br>>30 seconds<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>4.0 < gps < 20.0<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7<br><br>0.75 < C/L Int < 1.08<br>= TRUE<br>.(Please see **"Closed** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | delay time threshold is reached. | | | | **Loop Enable Clarification"** in Supporting Tables). | | |
| | | | | | Evap | not in control of purge | | |
| | | | | | Ethanol Estimation in Progress | = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). | | |
| | | | | | Baro | > 70kpa | | |
| | | | | | Post fuel cell | = enabled | | |
| | | | | | EGR Intrusive diagnostic | = not active | | |
| | | | | | All post sensor heater delays | = not active | | |
| | | | | | O2S Heater (post sensor) on Time | > 60.0 sec | | |
| | | | | | Predicted Catalyst temp | 550 < °C < 850 | | |
| | | | | | Fuel State | = DFCO possible | | |
| | | | | | ========== | ========== | | |
| | | | | | All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested. | | | |
| | | | | | ========== | ========== | | |
| | | | | | Pre O2S EQRB1S1 at end of Cat Rich stage | > 1.150EQR | | |
| | | | | | Fuel State | = DFCO active | | |
| | | | | | Number of fueled cylinders | < 7 cylinders | | |
| | | | | | ========== | ========== | | |
| | | | | | After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input). | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1) (For use with WRAF | P015D | DTC P015D detects that the primary WRAF oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P014B / P013D), which commands fuel enrichment.<br><br>Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from lean condition to above the 02 measured EQR threshold, otherwise the Secondary method is used.<br><br><u>Primary method:</u> The P015D diagnostic measures the primary WRAF 02 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro, and intake air temperature resulting in | Primary method: The EWMAofthe Pre 02 sensor normalized L2R time delay value.<br>The EWMA repass limit is<br>The EWMA calculation uses a 0.25 coefficient.<br><br>OR<br><br>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.<br><br>AND<br><br>Pre WRAF 02 sensor measured EQR is<br><br>OR<br><br>At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is | > 0.73 EWMA (sec)<br>< 0.63 EWMA (sec)<br><br>> 2.5 Seconds<br><br><0.900 EQR<br><br>< 1.150EQR | Diagnostic is Enabled<br><br>No Active DTC's<br><br>P015C test is complete and<br><br>System Voltage<br>EGR Device Control<br>Idle Device Control<br>Fuel Device Control<br>AIR Device Control | TPS_ThrottleAuthorityDefaulted<br>MAP_SensorFA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>MAF_SensorFA<br>EvapPurgeSolenoidCircuit_FA<br>EvapFlowDuringNonPurge_FA<br>EvapVentSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapEmissionSystem_FA<br>FuelTankPressureSnsrCkt_FA<br>FuelInjectorCircuit_FA<br>AIR System FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EthanolCompositionSensor_FA<br>EngineMisfireDetected_FA<br>WRAF_Bank_2_FA<br>P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273<br><br>= Passed<br><br>>10.5 Volts<br>= Not active<br>= Not active<br>= Not active<br>= Not active | Frequency: Once per trip<br>Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed | Type A, 1 Trips EWMA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015D is set when the EWMA value exceeds the EWMA threshold.<br>Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.<br><br><u>Secondary method:</u><br>This fault is set if the primary WRAF 02 sensor does not achieve the required higher measured EQR threshold before a delaytime threshold is | | | Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Green O2S Condition<br><br>02 Heater (pre sensor) on for<br><br>Engine Coolant<br>( Or OBD Coolant Enable Criteria<br><br>IAT<br>Engine run Accum<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Engine Airflow<br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled) | = False<br><br>= False<br><br>= Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than<br>**Multiple DTC Use_Green Sensor Delay Criteria - Limit**<br>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tablestab.<br>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.<br><br>> 40 seconds<br><br>> 50 °C<br><br>=TRUE)<br><br>> -40 °C<br>> 30 seconds<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>4.0 < gps < 20.0<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | reached. | | | Closed loop integral<br>Closed Loop Active<br><br><br><br><br><br>Evap<br><br>Ethanol Estimation in Progress<br><br><br><br>Baro<br>Post fuel cell<br>EGR Intrusive diagnostic<br>All post sensor heater delays<br>O2S Heater (post sensor) on Time<br><br>Predicted Catalyst temp<br>Fuel State<br>Number of fueled cylinders<br><br>==========<br>When above conditions are met: Fuel Enrich mode is entered.<br><br>==========<br><br>During this test: Engine Airflow must stay between:<br>and the delta Engine Airflow over 12.5msec must be : | 0.75 < C/L Int < 1.08<br>= TRUE<br>(Please see **"Closed Loop Enable Clarification"** in Supporting Tables).<br><br>not in control of purge<br><br>= Not Active<br>(Please see **"Ethanol Estimation in Progress"** in Supporting Tables).<br><br>> 70kpa<br>= enabled<br>= not active<br><br>= not active<br><br>> 60.0 sec<br><br>550 < °C < 850<br>= DFCO inhibit<br><br>> 1 cylinders<br><br>==========<br><br>==========<br><br>4 < gps < 20<br><br>< 100.0 gps | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| O2S Heater Performance Bank 2 Sensor 2 | P0161 | This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.<br><br>The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters. | Heater Current outside of the expected range of | 0.3 > amps > 2.9 | Diagnostic is Enabled<br><br>No Active DTC's<br>System Voltage<br>Heater Warm-up delay<br>02S Heater device control<br>B1S1 02S Heater Duty Cycle<br><br>All of the above met for | ECT_Sensor_FA<br>>10.5 Volts<br>= Complete<br><br>= Not active<br><br>> zero<br><br>> 120 seconds | /failures out of 9 samples<br><br>Frequency:<br>1 tests per trip<br>5 seconds delay between tests and 1 second execution rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel System Too Lean Bank 1 | P0171 | Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition.<br><br>A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. | The filtered long-term fuel trim metric<br><br>AND<br><br>The filtered short-term fuel trim metric<br>(Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria) | >= 1.341<br><br>>= 0.100<br><br>If a fault has been detected the long-term fuel trim metric must be < 1.290 and the short-term fuel trim metric must be < 1.150 to repass the diagnostic. | The primary fuel trim diagnostic is enabled<br><br>Engine speed<br>BARO<br>Coolant Temp<br><br>Coolant Temp<br>MAP<br>Inlet Air Temp<br>MAF<br>Fuel Level<br><br>Long Term Fuel Trim data accumulation:<br><br>Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis | 400 <rpm< 6,000<br>> 70 kPa<br>>-20 °C (or OBD Coolant Enable Criteria = TRUE)<br>< 135 °C<br>10 <kPa< 255<br>-20 <°C< 150<br>1 <g/s< 1,000<br>> 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.<br><br>> 19.00 seconds of data must accumulate on each trip, with at least 10.00 seconds of data in the current fuel trim cell before a pass or fail decision can be made. Additional time can be required for cold ambient starts to accommodate larger minimum LTM'sfor startability reasons. See **Startup Engine Coolant adjusment to Minimum accumulation time** .<br><br>(Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) | Frequency: 100 ms Continuous Loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Closed Loop<br>Long Term FT | Enabled<br>Enabled<br>(Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables.) | | |
| | | | | | EGR Diag.<br>Catalyst Diag.<br>Post 02 Diag.<br>Device Control<br>EVAPDiag. | Intrusive Test Not Active<br>Intrusive Test Not Active<br>Intrusive Test Not Active<br>Not Active<br>Large Leak Diagnostic (P0455) Not Active | | |
| | | | | | ----------<br>Delay during GPF Regeneration<br><br>Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.) | ----------<br>No Delay | | |
| | | | | | ----------<br>No active DTC: | ----------<br>IAC_SystemRPM_FA<br>MAP_SensorFA<br>MAF_SensorFA<br>MAF_SensorTFTKO<br>AIR System FA<br>EvapExcessPurgePsbl_FA<br>Ethanol Composition Sensor FA<br>FuelInjectorCircuit_FA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | EngineMisfireDetected_FA<br>EGRValvePerformance_FA<br>EGRValveCircuit_FA<br>MAP_EngineVacuumStatus<br>AmbPresDfltdStatus<br>TC_BoostPresSnsrFA<br>O2S_Bank_1_Sensor_1_FA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel System Too Rich Bank 1 | P0172 | Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition.<br><br>There are two methods to determine a Rich fault. They are Passive and Intrusive.<br><br>A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short- | **Passive Test:**<br>The filtered Non-Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Short Term Fuel Trim metric<br>(Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)<br>**********<br><br>**Intrusive Test:**<br>For 3 out of 5 intrusive segments<br><br>The filtered Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Non-Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Short Term Fuel Trim metric<br>(Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) | <= 0.705<br><br><br><br><br><= 2.000<br><br><br><br><br><br><br>**********<br><br><br><br><= 0.710<br><br><br><br><= 0.705<br><br><br><br><= 2.000<br><br><br><br><br>If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be > 0.715 and the short- | <br><br><br><br><br><br><br><br><br><br><br><br><br>**********<br><br>Purge Vapor Fuel | Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.<br><br><br><br><br><br><br><br><br><br><br><br><br>**********<br><br><= 100.00%<br><br>Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)<br><br>A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table<br>**Minimum Non-Purge Samples for Purge (Vapor Fuel )**<br>for the Purge Off cells used to validate the Purge Vapor Fuel parameter. | Frequency:<br>100 ms<br>Continuous<br>Loop<br><br><br><br><br><br><br><br><br><br><br><br><br>**********<br><br>**Segment Definition:**<br>Segments can last up to 60 seconds and are separated by the lesser of 20.00 seconds of purge-on time or enough time to purge 36 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.<br><br>Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.710 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is<= 0.710, the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.705 the fault will set.<br><br>Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several | | term fuel trim metric must be > 0.850 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure. | | If the accumulated purge volume is > 0.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 100.0 %. | time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.710 for at least 200.00 seconds, indicating that the canister has been purged. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 5 intrusive segments the diagnostic continues to pass, there is a delay period of 300 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel System Too Lean Bank 2 | P0174 | Determines if the primary fuel control system for Bank 2 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition.<br>A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. | The filtered long-term fuel trim metric<br><br>AND<br><br>The filtered short-term fuel trim metric<br>(Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria) | >= 1.341<br><br>>= 0.100<br><br>If a fault has been detected the long-term fuel trim metric must be < 1.290 and the short-term fuel trim metric must be < 1.150 to repass the diagnostic. | The primary fuel trim diagnostic is enabled<br><br>Engine speed<br>BARO<br>Coolant Temp<br><br>Coolant Temp<br>MAP<br>Inlet Air Temp<br>MAF<br>Fuel Level<br><br>Long Term Fuel Trim data accumulation:<br><br>Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis | 400 <rpm< 6,000<br>> 70 kPa<br>>-20 °C (or OBD Coolant Enable Criteria = TRUE)<br>< 135 °C<br>10 <kPa< 255<br>-20 <°C< 150<br>1 <g/s< 1,000<br>> 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.<br><br>> 19.00 seconds of data must accumulate on each trip, with at least 10.00 seconds of data in the current fuel trim cell before a pass or fail decision can be made.Additional time can be required for cold ambient starts to accommodate larger minimum LTM'sfor startability reasons. See **Startup Engine Coolant adjusment to Minimum accumulation time** .<br><br>(Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) | Frequency: 100 ms Continuous Loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Closed Loop<br>Long Term FT | Enabled<br>Enabled<br>(Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables.) | | |
| | | | | | EGR Diag.<br>Catalyst Diag.<br>Post 02 Diag.<br>Device Control<br>EVAPDiag. | Intrusive Test Not Active<br>Intrusive Test Not Active<br>Intrusive Test Not Active<br>Not Active<br>Large Leak Diagnostic (P0455) Not Active | | |
| | | | | | ----------<br>Delay during GPF Regeneration<br>Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.) | ----------<br>No Delay | | |
| | | | | | ----------<br>No active DTC: | ----------<br>IAC_SystemRPM_FA<br>MAP_SensorFA<br>MAF_SensorFA<br>MAF_SensorTFTKO<br>AIR System FA<br>EvapExcessPurgePsbl_FA<br>Ethanol Composition Sensor FA<br>FuelInjectorCircuit_FA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | EngineMisfireDetected_FA<br>EGRValvePerformance_FA<br>EGRValveCircuit_FA<br>MAP_EngineVacuumStatus<br>AmbPresDfltdStatus<br>TC_BoostPresSnsrFA<br>O2S_Bank_2_8ensor_1_FA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel System Too Rich Bank 2 | P0175 | Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition. | **Passive Test:**<br>The filtered Non-Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)<br>**************************** | <br><= 0.705<br><br><br><br><= 2.000<br><br>************************** | <br><br><br><br><br><br><br>****************************** | Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.<br>**************************** | Frequency: 100 ms Continuous Loop<br>******************* | Type B, 2 Trips |
| | | There are two methods to determine a Rich fault. They are Passive and Intrusive.<br><br>A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short- | **Intrusive Test:**<br>For 3 out of 5 intrusive segments,<br><br>the filtered Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Non-Purge Long Term Fuel Trim metric<br><br>AND<br><br>The filtered Short Term Fuel Trim metric (Note: any value abovel.05 effectively nullifies the short-term fuel trim criteria) | <br><br><br><= 0.710<br><br><br><br><= 0.705<br><br><br><br><= 2.000<br><br><br><br>If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be > | Purge Vapor Fuel | <= 100.00%<br>Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)<br><br>A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel )** for the Purge Off cells used to validate the Purge Vapor Fuel parameter.<br><br>If the accumulated purge volume is > 0.0 grams, | **Segment Definition:**<br>Segments can last up to 60 seconds and are separated by the lesser of 20.00 seconds of purge-on time or enough time to purge 36 grams of vapor.<br>A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test.<br>After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.<br><br>Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.710 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is<= 0.710, the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.705 the fault will set.<br><br>Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several | | 0.715 and the short-term fuel trim metric must be > 0.850 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure. | | the intrusive test will not be inhibited even if Purge Vapor Fuel is > 100.0 %.<br><br>(Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) | purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.710 for at least 200.00 seconds, indicating that the canister has been purged. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 5 intrusive segments the diagnostic continues to pass, there is a delay period of 300 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault | P0182 | This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold. | Fuel Temperature Sensor 1 SENT digital read value | < 145 | Fuel Temperature Out of Range Diagnoistic Enabled<br><br>No Fault Active on<br><br>No Fault Pending on | True<br><br>Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>SENT Intenal Error Fault Active (P126E)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)<br><br>SENT Intenal Error Fault Pending (P126E)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C) | 50.00 failures out of 62.00 samples<br>100 ms per Sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 1 Circuit High Fault | P0183 | This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is above the upper digital threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold. | Fuel Temperature Sensor 1 SENT digital read value | > 1,865 | Fuel Temperature Out of Range Diagnoistic Enabled<br><br>No Fault Active on<br><br>No Fault Pending | True<br><br>Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>SENT Intenal Error Fault Active (P126E)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)<br><br>SENT Intenal Error Fault Pending (P126E)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C) | 50.00 failures out of 62.00 samples<br>100 ms per Sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault | P0187 | This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is below the lower digital read threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold. | Fuel Temperature Sensor 1 SENT digital read value | < 145.00 | Fuel Temperature Out of Range Diagnoistic Enabled<br><br>No Fault Active on<br><br>No Fault Pending | True<br><br>Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>SENT Intenal Error Fault Active (P126F)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)<br><br>SENT Intenal Error Fault Pending (P126F)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D) | 50.00 failures out of 62.00 samples<br>100 ms per Sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 2 Circuit High Fault | P0188 | This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is above the upper digital read threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold. | Fuel Temperature Sensor 1 SENT digital read value | > 1,865.00 | Fuel Temperature Out of Range Diagnoistic Enabled<br><br>No Fault Active on<br><br>No Fault Pending | True<br><br>Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br>SENT Intenal Error Fault Active (P126F)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)<br><br>SENT Intenal Error Fault Pending (P126F)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D) | 50.00 failures out of 62.00 samples<br>100 ms per Sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pressure Sensor "B" Circuit Range/ Performance | P018B | This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test ( as follows)<br>a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time ( min or max duty cycle) >= 5 sec<br><br>Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_ MinPres<br><br>Variance ;<br>Otherwise, Report status as Pass<br>b] Intrusive test freq limit: 60 sec between intrusive tests that pass,<br>c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate | Sensed fuel pressure change<br><br>[absolute value, during intrusive test] | >= 30.00 kPa | a) Diagnostic is ..<br><br>b) Timer Engine Running<br><br>c1) Fuel Flow Rate Valid<br>c2) Fault bundle FDB_FuelPresSnsrCktFA<br>c3) Reference Voltage Fault Status [DTC P0641]<br>c4) Fault bundle FAB_FuelPmpCktFA<br>c5) Fuel Control Enable Fault Active [DTC P12A6]<br>c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]<br>c7) Fuel Pump Speed Fault Active [DTCP129F]<br>c8) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C]<br>c9) CAN Sensor Bus Fuel Pmp Speed Command ARC and Checksum Comm Fault Code [DTC U18A7]<br>c10) Fuel Pump Duty Cycle Fault Active<br>d 1) Sensor Configuration [Wired to FTZM?]<br><br>c12) Sensor Bus Relay On<br>d) Emissions Fuel Level Low [Message $3FB]<br>e) Fuel Control Enable<br>f) Fuel Pump Control State<br><br>g) Instantaneous Fuel | a) ENABLED<br><br>b) >= 5.00 seconds<br><br>c1)== TRUE<br>c2) == False<br><br>c3) == False<br><br>c4] == False<br><br>c5) == False<br><br>c6) == False<br><br>c7) == False<br><br>c8) == False<br><br>c9] == False<br><br>c10) == False<br><br>c11) == CeFDBR_e_WiredTo_FT ZM<br>c12) == TRUE<br><br>d) == False<br><br>e) == TRUE<br>f) == Normal Control OR<br>== Fuel Pres Sensor Stuck Control<br>g) >= 0.05 gm/sec | 1 sample/<br><br>12.5 millisec<br><br>Intrusive Test Duration:<br><br>Fuel Flow - related ( 5 to 12 sec) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Flow<br>h) Diagnostic System Disabled<br>j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [DTCU18A7]<br>j2) CAN Sensor Bus message $0C3_Available<br>j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][DTC U18A7] | h) == False<br>j1)== False<br>j2) == TRUE<br>j3) == False | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pressure Sensor "B" Circuit Low | P018C | This DTC detects if the fuel pressure sensor circuit is shorted low<br><br>Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%] | Fuel Pressure Sensor output %<br><br>[re. full range as percent of 5.0V reference] | < 4.00 %<br>or<br>[0 kPa gauge] | a) Diagnostic is ..<br><br>b) Run_Crank Active<br><br>c) Diagnostic System Disabled<br><br>d) Pressure Sensor Configuration | a) ENABLED<br><br>b) == TRUE<br><br>c) == False<br><br>d) If calibration value CeFDBR_e_WiredTo_FTZM<br>== WiredToECM<br>Else<br>see Case2 | 64.00 failures/ 80.00 samples<br><br>1 sample/12.5 ms | Type B, 2 Trips |
| | | | Fuel Pressure Sensor output %<br><br>[re. full range as percent of 5.0V reference] | < 4.00 %<br>or<br>[0 kPa gauge] | a) Diagnostic is ..<br><br>b) Run_Crank Active<br><br>c) Diagnostic System Disabled<br><br>d1) Pressure Sensor Configuration<br><br>d2) Sensor Bus Relay On<br><br>d3) CAN Sensor Bus message $0C3 Available<br><br>d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B$0C3] [Infol] | a) ENABLED<br><br>b) == TRUE<br><br>c) == False<br><br>d1) If calibration value CeFDBR_e_WiredTo_FTZM<br>== WiredTo FTZM<br>Else<br>see Casel<br><br>d2) == TRUE<br><br>d3) == TRUE<br><br>d4) == False | 64.00 failures/ 80.00 samples<br><br>1 sample/12.5 ms | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pressure Sensor "B" Circuit High | P018D | This DTC detects if the fuel pressure sensor circuit is shorted High<br><br>Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%] | Fuel Pressure Sensor output %<br><br>[re. full range as percent of 5.0V reference] | > 96.00 %<br>or<br>[743 kPa ga] | a) Diagnostic is ..<br><br>b) Run_Crank Active<br><br>c) Diagnostic System Disabled<br><br>d) Pressure Sensor Configuration | a) ENABLED<br><br>b) == TRUE<br><br>c) == False<br><br>d) If calibration value CeFDBR_e_WiredTo_FTZM<br>== WiredToECM<br>Else<br>see Case2 | 64.00 failures/ 80.00 samples<br><br>1 sample/12.5 ms | Type B, 2 Trips |
| | | | Fuel Pressure Sensor output %<br><br>[re. full range as percent of 5.0V reference] | > 96.00 %<br>or<br>[743 kPa ga] | a) Diagnostic is ..<br><br>b) Run_Crank Active<br><br>c) Diagnostic System Disabled<br><br>d1) Pressure Sensor Configuration<br><br>d2) Sensor Bus Relay On<br><br>d3) CAN Sensor Bus message $0C3 Available<br><br>d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][Info1] | a) ENABLED<br><br>b) == TRUE<br><br>c) == False<br><br>d1) If calibration value CeFDBR_e_WiredTo_FTZM<br>== WiredTo FTZM<br>Else<br>See Case 1<br><br>d2) == TRUE<br><br>d3) == TRUE<br><br>d4) == False | 64.00 failures/ 80.00 samples<br><br>1 sample/12.5 ms | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT SIDI High Pressure Sensor Performance | P0191 | The DTC determines if there is a skewed control fuel rail sensor (Sensori) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady. | Primary sensor (P1) vs. Secondary sensor (P2) performance rationality<br><br>((Low Limit fail Filtered Fuel Control Error )<br><br>OR<br><br>(High Limit Fail: Filtered Fuel Control Error))<br><br>AND<br><br>(Filtered Absolute delta between sensori and sensor2 | <=<br>**P0191 - Low fail limit of fuel control due to pressure sensor skewed low**<br>(See supporting table)<br><br>>=<br>**P0191 - High fail limit of fuel control due to high pressure sensor skewed High**<br>(see Supporting table)<br><br>>= 1.00 mpa<br><br>Note:<br>fuel control error is calcuated based on the squreroot of senorl divided by sensor2, this value is filter to ensure proper failure detection.<br><br>Absolute delta between sensori and sensor2 value is filter to ensure proper failure detection. | Commanded Pressure rate of change (increasing or dercresing)<br><br>fora period of time | <0.70 mpa<br><br>>= 1.25 seconds<br><br>Enabled when a code clear is not active or not exiting device control | Filter Fuel Control Error term and Absolute delta between sensori and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds<br><br>This is diagnostic runs Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure Sensor 1 Out of Range | P0192 | This DTC diagnose SENT high pressure sensor 1 that is too low out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold. | High Pressure Rail Sensor 1 SENT digital read value | =< 94 | | | Time Based: 400 Failuerout of 500 Samples 6.25 ms per Sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Temperature (EOT) Sensor Performance | P0196 | Determines if the engine oil temperature (EOT) sensor is stuck or biased in range. Three independent tests can be used.1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests). 2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred. 3) Continuous Test Compares the measured EOT to modeled EOT on a continuous basis on a warm engine. | **Fast Cold Start Test**<br><br><u>To indicate an fast fail:</u><br><br>Absolute value of Powerup EOT - Powerup ECT<br><br>AND<br>Absolute value of Powerup IAT - Powerup ECT<br><br><u>To indicate a fast pass:</u><br><br>Absolute value of Powerup EOT - Powerup ECT<br>AND<br>Absolute value of Powerup EOT - Powerup IAT | EOT Temp Diff > **FastFailTempDiff** (See P0196 details on Supporting TablesTab)<br><br>AND<br><br>< 16 degrees C<br><br>< 16 degrees C<br><br>AND<br><br>< 16 degrees C | EOT Diagnostic main Status<br>AND<br>Engine Running<br><br>Cold Start Specific EOT Test Conditions:<br><br>Use Cold Start Diagnostic<br><br>Engine Off Time<br><br>Engine Off Timer Validity<br><br>No active DTC's | Enabled<br><br>= True<br><br>Enabled<br><br>> 540 Seconds<br><br>= True<br><br>Fault bundles:<br>IgnitionOffTimer_FA<br>IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA<br>EngOilTempSensorCircuit FA | Cold Start Fast Test- one failure out of one sample - test performed once per second | Type B, 2 Trips |
| | | | **Cold Start Test**<br><br><u>Pass Condition 1:</u><br>Absolute value of Powerup EOT - Powerup ECT<br>AND<br>Absolute value of Powerup EOT - minIAT<br><br>OR<br><br><u>Pass Condition 2:</u><br>Absolute value of Powerup EOT - Powerup ECT | <= 16 Deg C<br><br><= 16 Deg C<br><br>OR<br><br>> 16 Deg C | All three tests (Cold/ Warm/Continuous)<br><br>EOT Diagnostic main enable<br>AND<br>Engine Running<br><br>Cold Start Specific EOT Test Conditions:<br><br>Use Cold Start Diagnostic<br><br>Engine Off Time<br><br>Engine Off Timer Validity | Enabled<br><br>= True<br><br>Enabled<br><br>> 540 Seconds<br><br>= True | Cold Start Regular Test- one failure out of one sample - test performed once per second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | AND<br>(IAT minimum observed with Block Heater<br>or<br>(IAT minimum observed<br>and<br>Absolute value of power up IAT - min. observed IAT))<br>AND<br>Absolute value of Powerup EOT - Powerup IAT<br>AND<br>Absolute value of Powerup EOT - minIAT<br><br><u>Fail Condition:</u><br>Absolute value of Powerup EOT - Powerup EOT<br>AND<br>(IAT minimum observed with Block Heater<br>or<br>(IAT minimum observed<br>and<br>Absolute value of power up IAT - min. observed IAT))<br>AND<br>(Absolute value of Powerup EOT - Powerup IAT<br>or<br>Absolute value of Powerup EOT - minIAT)<br>AND<br>Absolute value of Powerup EOT - Powerup IAT | AND<br>> -7 Deg C<br>> -10 Deg C<br><= 5 Deg C<br>AND<br><= 16 Deg C<br><= 16 Deg C<br><br>> 16 Deg C<br>AND<br>> -7 Deg C<br>> -10 Deg C<br><= 5 Deg C<br>AND<br>> 16 Deg C<br>> 16 Deg C<br>AND<br><= 16 Deg C | Time above Minimum Vehicle Speed<br>Time less than Vehicle speed resets above timer<br>No active DTC's | > 9 MPH for<br>> 400 seconds<br>< 15.0 for<br>> 20.0 seconds<br>Fault bundles:<br>IgnitionOffTimer_FA<br>IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA<br>EngOilTempSensorCircuit FA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | AND<br><br>Absolute value of Powerup ECT - minIAT | AND<br><br><= 16 Deg C | | | | |
| | | | **Warmup Test**<br><br><u>Warm Up Fail Condition:</u><br><br>EOT<br><br><u>Warm Up Test Pass Condition:</u><br><br>EOT | <br><br><br>< 70 Deg C<br><br><br><br>=> 70 Deg C | EOT Diagnostic main enable<br>Engine Running<br><br>Warm Up EOT Test Specific Conditions:<br>Use Warm Up EOT Diagnostic<br><br>Power up ECT<br><br>Power up ECT<br><br>Total accumulated engine airflow since engine start<br><br>DISABLE CONDITIONS (for all three tests)No active DTC's | Enabled<br><br>= True<br><br><br>Disabled<br><br>> 200 degrees C<br><br>< 200 degrees C<br><br>>= **P0196_TotalAccumulatedFlow** (See P0196 details on Supporting TablesTab)<br><br>Fault bundles:<br>IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA<br>EngOilTempSensorCircuit FA | Warm up Tests- one failure out of one sample - test performed once per second | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | **Continuous Test**<br><br><u>Pass Condition:</u><br><br>(Measured Oil Temperature - Modeled Oil Temperature)<br>OR<br>Absolute value of (Measured Oil Temperature - Modeled Oil Temperature)<br><br><u>Fail Condition:</u><br><br>(Measured Oil Temperature - Modeled Oil Temperature)<br>AND<br>Absolute value of (Measured Oil Temperature - Modeled Oil Temperature) | >= 0 and <=40.0<br><br>OR<br><br>>= 0 and <=40.0<br><br>> 40.0<br><br>AND<br><br>> 40.0 | EOT Diagnostic main enable<br><br>Engine Running<br><br>Continuous EOT Test Specific Conditions:<br>Use Continuous Diagnostic<br><br>Power up ECT<br>and<br>ECT<br><br>All of three criteria above<br>AND<br><br>EOT Model Oil Temperature reach Equilibrium<br><br>OR<br><br>Use quick transition to equilibrium state and ECT<br><br>DISABLE CONDITIONS (for all three tests)No active DTC's | Enabled<br><br>= True<br><br>Enabled<br><br>>= -7 and <= 105 Deg C<br><br>>= 45 and <= 105 Deg C<br><br>>= 93 Deg C<br><br>Enabled and >= ECT from 5 sec previous<br><br>Fault bundles:<br>IAT_SensorFA<br>ECT_Sensor_Ckt_FA<br>MAF_SensorFA<br>EngOilTempSensorCircuit FA<br>IAT_SensorCircuitFA<br>EngOilModeledTempValid | Continuous Test 70 failures out of 100 samples performed once per second | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Temperature (EOT) Circuit Low | P0197 | Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Engine Oil Temperature Sensor (EOT) Circuit Resistance | < 25 ohms | Diagnostic Status | Enabled | 4 failures out of 5 samples Sampled every 1 second | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Temperature (EOT) Circuit High | P0198 | Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Engine Oil Temperature Sensor (EOT) Circuit Resistance | > 450,000 ohms | Diagnostic Status<br><br>Engine Run Time<br><br>OR<br><br>ECT | Enabled<br><br>> 20.0 seconds<br><br>>= -20 Deg C | 4 failures out of 5 samples Sampled every 1 second | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Temperature Sensor (EOT) Circuit Intermittent | P0199 | Determines if an intermittent fault exists on the engine oil temperature sensor circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period. | **Continuous Test**<br><br><u>Pass/Fail Condition:</u><br><br>Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature) | String Length >= 20.00 °C | None | Enabled | 4 failures out of 5 samples, sampled every 2 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Temperature Dropped Below Diagnostic Monitoring Temperature | P01F0 | This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle. | Engine outlet coolant temperature drops below for an unexpected reason | < 75.9 Deg C | Diagnostic is Enabled<br><br>No Active DTC's<br><br>Engine Runtime<br><br>Distance traveled this key cycle<br><br>Ambient air pressure<br><br>Ambient air temperature<br>**********<br><br>Engine coolant temperature<br>At least once during the key cycle<br>**********<br><br>Heat to coolant<br><br>DFCO time<br><br>Thermostat duty cycle | <br><br>ECT_Sensor_Ckt_FA<br>VehicleSpeedSensor_FA<br>OAT_PtEstFiltFA<br>THMR_AWP_AuxPumpFA<br>THMR_AHV_FA<br>THMR_SWP_Control_FA<br>EngineTorqueEstInaccurate<br>ECT_Sensor_Perf_FA<br>THMR_SWP_NoFlow_FA<br>THMR_SWP_Flow8tuckOn_FA<br><br>>0.0 seconds<br><br>>1.2 km<br><br>> 55.0 kPa<br><br>>-9.0 Deg C<br><br>> 79.9 Deg C<br><br>><br>**P01F0 - Heat To Coolant Min 2D**<br><br>< 10.0 seconds<br><br>< 100.0% | 30 seconds out of a 60 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | RPM<br><br>Active Fuel Management is not in | < 8,192<br><br>Half Cylinder Mode | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 Open Circuit - (SIDI) | P0201 | Controller specific output driver circuit diagnoses Injector 1 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 1 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00<br><br>samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 Open Circuit - (SIDI) | P0202 | Controller specific output driver circuit diagnoses Injector 2 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 2 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 Open Circuit - (SIDI) | P0203 | Controller specific output driver circuit diagnoses Injector 3 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 3 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 Open Circuit - (SIDI) | P0204 | Controller specific output driver circuit diagnoses Injector 4 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 4 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 Open Circuit - (SIDI) | P0205 | Controller specific output driver circuit diagnoses Injector 5 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 5 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Sec<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 Open Circuit - (SIDI) | P0206 | Controller specific output driver circuit diagnoses Injector 6 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 6 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>= 0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 Open Circuit - (SIDI) | P0207 | Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 Open Circuit - (SIDI) | P0208 | Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>Or<br><br>Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.<br><br>Or<br><br>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground<br><br>>= 200 KOhms impedance between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| TPS2 Circuit Low | P0222 | Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough. | TPS2 % Vref <<br><br>(100% corresponds to 5.0 Volt) | 5.00 % Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 79/159 counts;<br><br>57 counts continuous;<br><br>3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| TPS2 Circuit High | P0223 | Detects a continuous or intermittent short high in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough. | TPS2 % Vref ><br><br>(100% corresponds to 5.0 Volt) | 91.80% Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 79/159 counts;<br><br>57 counts continuous; 3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 Low side circuit shorted to ground (SIDI) | P0261 | Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 Low side circuit shorted to power (SIDI) | P0262 | Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 Low side circuit shorted to ground (SIDI) | P0264 | Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 Low side circuit shorted to power (SIDI) | P0265 | Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 Low side circuit shorted to ground (SIDI) | P0267 | Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 Low side circuit shorted to power (SIDI) | P0268 | Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 Low side circuit shorted to ground (SIDI) | P0270 | Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 Low side circuit shorted to power (SIDI) | P0271 | Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 Low side circuit shorted to ground (SIDI) | P0273 | Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 Low side circuit shorted to power (SIDI) | P0274 | Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 Low side circuit shorted to ground (SIDI) | P0276 | Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 Low side circuit shorted to power (SIDI) | P0277 | Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 Low side circuit shorted to ground (SIDI) | P0279 | Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 Low side circuit shorted to power (SIDI) | P0280 | Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 Low side circuit shorted to ground (SIDI) | P0282 | Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <br><br><br><br><br><br><br><br><= 1 volt between signal and controller ground | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 Low side circuit shorted to power (SIDI) | P0283 | Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 to 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Injector Circuit Range/ Performance | P02EE | Diagnostic to determine if Cylinder 1 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Injector Circuit Range/ Performance | P02EF | Diagnostic to determine if Cylinder 2 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Injector Circuit Range/ Performance | P02F0 | Diagnostic to determine if Cylinder 3 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Injector Circuit Range/ Performance | P02F1 | Diagnostic to determine if Cylinder 4 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Injector Circuit Range/ Performance | P02F2 | Diagnostic to determine if Cylinder 5 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Injector Circuit Range/ Performance | P02F3 | Diagnostic to determine if Cylinder 6 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Injector Circuit Range/ Performance | P02F4 | Diagnostic to determine if Cylinder 7 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Injector Circuit Range/ Performance | P02F5 | Diagnostic to determine if Cylinder 8 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Random Misfire Detected<br><br>Cylinder 1 Misfire Detected<br><br>Cylinder 2 Misfire Detected<br><br>Cylinder 3 Misfire Detected<br><br>Cylinder 4 Misfire Detected<br><br>Cylinder 5 Misfire Detected<br><br>Cylinder 6 Misfire Detected<br><br>Cylinder 7 Misfire Detected<br><br>Cylinders Misfire Detected | P0300<br><br>P0301<br><br>P0302<br><br>P0303<br><br>P0304<br><br>P0305<br><br>P0306<br><br>P0307<br><br>P0308 | These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.<br><br>Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip<br><br>Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper | Crankshaft Deceleration Value(s) vs.<br>Engine Speed and Engine load<br><br>The equation used to calculate deceleration value is tailored to specific vehicle operating conditions.<br>The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region***<br>see Algorithm Description Document for additional details.<br><br>SINGLE CYLINDER CONTINUOUS MISFIRE(<br>(Medres_Decel<br>Medres_Jerk<br><br>OR (Medres_Decel<br>Medres_Jerk<br><br>OR (LoresJDecel<br>Lores_Jerk<br><br>OR (Lores_Decel<br>Lores_Jerk<br><br>OR RevBalanceTime<br>) | - see details of thresholds on Supporting TablesTab<br><br>**> RufSCD_Decel** AND<br>**> RufSCD_Jerk)**<br><br>**> SCD.Decel** AND<br>**> SCD_Jerk )**<br><br>**> RufCyl_Decel** AND<br>**> RufCyl.Jerk)**<br><br>**> CylModeDecel** AND<br>**> CylModeJerk )**<br><br>**>RevMode_Decel** | Engine Run Time<br><br>Engine Coolant Temp<br><br>Or If ECT at startup Then<br><br>System Voltage<br>+ Throttle delta<br>- Throttle delta<br><br>Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.) | > 2 crankshaft revolution<br><br>"ECT"<br>If OBD Max Coolant Achieved = FALSE<br>-12°C< ECT<br>Or if OBD Max Coolant Achieved = TRUE<br>-12°C<ECT< 130°C<br><br>< -12°C<br>If OBD Max Coolant Achieved = FALSE<br>21°C < ECT<br>If OBD Max Coolant Achieved = TRUE<br>21°C < ECT < 130°C<br><br>9.00 < volts < 32.00<br>< 95.00 % per 25 ms<br>< 95.00 % per 25 ms<br><br>Not Enabled | Emission Exceedence = any (5) failed 200 rev blocks out of (16)200 rev block tests<br><br>Failure reported for(1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter.<br><br>OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip | Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | between engine and transmission can go into extreme resonance. Default action is to move rpm out of the resonance zone. If default action not activated, significant hardware damage could occur rendering vehicle inoperable. | **********<br><br>**This Feature not used on Gasoline engines**<br><br>Combustion Modes that force selection of Idle<br>J* l?JJi**********<br><br>Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables:<br><br>RANDOM MISFIRE<br>Use random misfire thresholds If no misfire for<br><br>(Medres_Decel<br>AND<br>Medres_Jerk)<br><br>OR (Medres_Decel<br>AND<br>Medres_Jerk)<br><br>OR (LoresJDecel<br>AND<br>Lores_Jerk) | **********<br><br>**This Feature not used on Gasoline engines**<br><br>**CombustModeIdleTbl** in Supporting Tables<br>**********<br><br>> 3 Engine Cycles<br><br>**> RufSCD_Decel * Random_SCD_Decel**<br><br>**>RufSCD_Jerk * Random_SCD_Jerk**<br><br>**>SCD_Decel * Random_SCD_Decel**<br><br>**> SCD_Jerk * Random_SCD_Jerk**<br><br>**> RufCyl_Decel * RandomCylModDecel**<br><br>**> RufCyl_Jerk * RandomCylModJerk** | | | any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.<br><br>Catalyst Failure reported with (1 or 3) Exceedences in FTP,or(1) Exceedence outside FTP.<br><br>Continuous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | OR (Lores_Decel AND Lores_Jerk) | **> CylModeDecel * RandomCylModDecel**<br>**> CylModeJerk * RandomCylModJerk** | | | | |
| | | | OR RevBalanceTime | **> RevMode_Decel * RandomRevModDecl** | | | | |
| | | | PAIRED CYLINDER MISFIRE<br>If a cylinder & it's pair are above PAIR thresholds<br>(Medres_Decel AND Medres_Jerk) | **> RufSCD_Decel * Pair_SCD_Decel**<br>**> RufSCD_Jerk * Pair_SCD_Jerk** | | | | |
| | | | OR (Medres_Decel AND Medres_Jerk) | **>SCD_Decel * Pair_SCD_Decel**<br>**>SCD_Jerk * Pair_SCD_Jerk** | | | | |
| | | | OR (LoresJDecel AND Lores_Jerk) | **> RufCyl_Decel * PairCylModeDecel**<br>**> RufCyl.Jerk * PairCylModeJerk** | | | | |
| | | | OR (Lores_Decel AND Lores_Jerk) | **> CylModeDecel * PairCylModeDecel**<br>**> CylModeJerk * PairCylModeJerk** | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel) | **> CylModeDecel * PairCylModeDecel** | | | | |
| | | | BANK MISFIRE Cylinders above Bank Thresholds | >= 2 cylinders | | | | |
| | | | (Medres_Decel | **> RufSCD_Decel * Bank_SCD_Decel** | | | | |
| | | | AND Medres_Jerk) | **> RufSCD_Jerk * Bank_SCD_Jerk** | | | | |
| | | | OR (Medres_Decel | **>SCD_Decel * Bank_SCD_Decel** | | | | |
| | | | AND Medres_Jerk) | **>SCD_Jerk * Bank_SCD_Jerk** | | | | |
| | | | OR (LoresJDecel | **> RufCyl_Decel * BankCylModeDecel** | | | | |
| | | | AND Lores_Jerk) | **> RufCyl.Jerk * BankCylModeJerk** | | | | |
| | | | OR (Lores_Decel | **> CylModeDecel * BankCylModeDecel** | | | | |
| | | | AND Lores_Jerk) | **> CylModeJerk * BankCylModeJerk** | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | CONSECUTIVE CYLINDER MISFIRE<br>1st cylinder uses single cyl continuous misfire thresholds;<br>2nd Cylinder uses:<br>(Medres_Decel<br>AND<br>Medres_Jerk)<br><br>OR (Medres_Decel<br>AND<br>Medres_Jerk)<br><br>OR (LoresJDecel<br>AND<br>Lores_Jerk)<br><br>OR (Lores_Decel<br>AND<br>Lores_Jerk) | **> RufSCD_Decel * ConsecSCD_Decel**<br>**> RufSCD_Jerk * ConsecSCD_Jerk**<br><br>**>SCD_Decel * ConsecSCD_Decel**<br>**>SCD_Jerk * ConsecSCD_Jerk**<br><br>**> RufCyl_Decel * ConsecCylModDecel**<br>**> RufCyl.Jerk * ConsecCylModeJerk**<br><br>**> CylModeDecel * ConsecCylModDecel**<br>**> CylModeJerk * ConsecCylModeJerk** | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | CYLINDER DEACTIVATION MODE (Active Fuel Managment)<br><br>AFM: SINGLE CYLINDER CONTINUOUS MISFIRE<br>(CylAfterDeacCyl_Decel<br>AND<br>CylAfterDeacCyl_Jerk)<br><br>OR<br>(CylBeforeDeacCylDecel<br>AND<br>CylBeforeDeacCyl_Jerk) | **> CylModeDecel * ClyAfterAFM_Decel**<br><br>**> CylModeJerk * CylAfterAFM.Jerk**<br><br>**> CylModeDecel * CylBeforeAFM_Decel**<br><br>**> CylModeJerk * ClyBeforeAFM_Jerk** | | | | |
| | | | AFM: RANDOM MISFIRE<br>Use random misfire thresholds If no misfire for<br><br>(CylAfterDeacCyl_Decel<br>AND<br>CylAfterDeacCyl_Jerk)<br><br>(CylBeforeDeacCylDecel<br>AND | > 3 Engine Cycles<br><br>**> CylModeDecel * ClyAfterAFM_Decel * RandomAFM_Decl**<br><br>**> CylModeJerk * CylAfterAFM_Jerk * RandomAFM_Jerk**<br><br>**> CylModeDecel * CylBeforeAFM_Decel * RandomAFM_Decl** | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | CylBeforeDeacCyl_Jerk) | **> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk** | | | | |
| | | | OR IF option Crank based IMEP estimate is Enabled and CrankBasedJMEP is | IMEP Enabled<br><br>< **Misfire_IMEP_Thresh _vs_BinID** (Note: Thresholds uses following tables to pick threshold vs BinID. See supporting tables for more information on how BinID works to select appropriate calibration threshold) **Misfire_IMEP_BinID_ vs_RPM_Load Misfire_IMEP_BinID_ RPM_Axis Misfire_IMEP_BinID_ Load_Axis**<br><br>- see details on Supporting TablesTab | | | | |
| | | | Misfire Percent Emission Failure Threshold | > 2.00%P0300 | | | | |
| | | | -Misfire Percent Catalyst __ | > | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Damage<br><br>When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed. | **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.<br><br>< 2,000 FTP rpm AND<br>< 20 FTP % load | (at low speed/loads, one cylinder may not cause cat damage)<br>Engine Speed<br>Engine Load<br>Misfire counts | > 2,000 rpm AND<br>> 20 % load AND<br>< 180 counts on one cylinder | | |
| | | | | | Engine Speed | 400 < rpm < ((Engine Over Speed Limit) - 400 ) OR 8,191 )<br><br>Engine speed limit is a function of inputs like Gear and temperature<br><br>see **EngineOverSpeedLimit** in supporting tables | 4 cycle delay | |
| | | | | | No active DTCs: | TPS_FA<br>EnginePowerLimited<br>MAF_SensorTFTKO<br>MAP_SensorTFTKO<br>IAT_SensorTFTKO<br>ECT_Sensor_Ckt_TFTKO<br>5VoltReferenceB_FA<br>CrankSensor_TFTKO<br>CrankSensor_FA<br>CamLctnIntFA | 4 cycle delay | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CamLctnExhFA<br>CamSensorAnyLctnTFTK0<br>AnyCamPhaser_FA<br>AnyCamPhaser_TFTKO<br>AmbPresDfltdStatus | | |
| | | | | | P0315 & engine speed | > 1,000 rpm | 4 cycle delay | |
| | | | | | Fuel Level Low | LowFuelConditionDiagnostic | 500 cycle delay | |
| | | | | | Cam and Crank Sensors | in sync with each other | 4 cycle delay | |
| | | | | | Misfire requests TCC unlock | Not honored because Transmission in hot mode or POPD intrusive diagnostic running | 4 cycle delay | |
| | | | | | Fuel System Status | # Fuel Cut | 4 cycle delay | |
| | | | | | Active FuelManagement | Transition in progress | 7 cycle delay | |
| | | | | | Undetectable engine speed and engine load region | ***Undetectable region*** from Malfunction Criteria | 4 cycle delay | |
| | | | | | Abusive Engine Over Speed | > 8,192 rpm | 0 cycle delay | |
| | | | | | Below zero torque (except CARB approved 3000 rpm to redline triangle.) | **< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables | 4 cycle delay | |
| | | | | | Below zero torque:<br>TPS<br>Vehicle Speed | < 1.1 % (< 1.1% in AFM)<br>> 30 mph (> 30 mph AFM) | 4 cycle delay | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | NEGATIVE TORQAFM<br>If deactivated cylinders appear to make power, torque is negative:<br>DeactivatedCyl_Decel<br>AND<br>DeactivatedCyl_Jerk<br>AND<br># of Deact Cyls Inverted | <br><br><br><br>**<DeacCylInversionDecel**<br><br>**<DeacCylInversionJerk**<br><br>> 3 cylinders | 2 cycle delay | |
| | | | | | Manual Trans | Clutch shift | 4 cycle delay | |
| | | | | | Accel Pedal Position AND Automatic transmission shift | > 95.00% | 7 cycle delay | |
| | | | | | After Fuel resumes on Automatic shift containing Fuel Cut | | 2 Cylinder delay | |
| | | | | | Delay if PTC engaged | Enabled | 4 cycle delay | |
| | | | | | Delay if error in indices of buffered data is detected and delay is enabled | Delay Enabled | 3 cycle delay | |
| | | | | | Delay if IMEP calculation | initializing on startup or running resets (expires before rpm enablement) | 4 cycle delay | |
| | | | | | ********** | ********** | ********** | |
| | | | | | **This Feature not used on Gasoline engines** | | | |
| | | | | | Combustion Mode | **= InfrequentRegen** value in Supporting Tables | 0 cycle delay | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Driver cranks before Wait to Start lamp extinguishes | IF TRUE | **WaitToStart** cycle delay | |
| | | | | | B *r* *U PTPLU ********** * | >4a§. *Mws*TP**w*** | *Qpy4p* p4y**** | |
| | | | | | DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. | | | |
| | | | | | Filter Driveline ring: | **> "Ring Filter"#** of engine cycles after misfire in Supporting Tables | | |
| | | | | | Stop filter early: | **> "Number of Normals"** # of engine cycles after misfire in Supporting Tables tab | | |
| | | | | | ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal). ) | | | |
| | | | | | Used Off Idle, and while not shifting, | | | |
| | | | | | TPS | > 3 % | | |
| | | | | | Engine Speed | > 950 rpm | | |
| | | | | | Veh Speed | > 3 mph | | |
| | | | | | Auto Transmission | not shifting | | |
| | | | | | indivdual candidate deemed abnormal if number of consecutive decelerating | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | cylinders after "misfire": (Number of decels can vary with misfire detection equation)<br>Consecutive decels while in SCD Mode<br>Cyl Mode<br>Rev Mode | **> Abnormal SCD Mode**<br>**> Abnormal Cyl Mode**<br>**> Abnormal Rev Mode**<br>in Supporting Tables | | |
| | | | | | At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles,<br>abnormal candidates/ total candidates | >0.50 ratio | discard 100 engine cycle test | |
| | | | | | MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized).<br>At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the100 engine cvcles. | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages | Enabled | | |
| | | | | | Pattern Recog Enabled: | Not Enabled | | |
| | | | | | Pattern Recog Enabled during Cylinder Deac | Enabled | | |
| | | | | | Pattern Recog Enabled consecutive cyl pattrn | | | |
| | | | | | Engine Speed | 1,000 < rpm < 3,000 | | |
| | | | | | Veh Speed | > 5.0 mph | | |
| | | | | | The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. | | | |
| | | | | | (CylAfter_Accel | > Misfire_ decel * **1st_FireAftrMisfr_Acel** | | |
| | | | | | AND | | | |
| | | | | | CylAfter_Jerk) | > Misfire_Jerk * **1st_FireAftrMisfr_Jerk** | | |
| | | | | | | Or if AFM mode is active: > Misfire_ decel * **IstFireAftrMisAcelAFM** > Misfire_Jerk * **IstFireAfterMisJerkAFM** | | |
| | | | | | Addtionally, the crankhaft is checked aaain a small _ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddtjerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance. | | | |
| | | | | | Num of Cylinders after misfire to start check of crankshaft snap | 3 Cylinders | | |
| | | | | | "misfire" recognized if: Crankshaft snap after: isolated "misfire" | < Misfire_Jerk * **SnapDecayAfterMisfire** | | |
| | | | | | repetative "misfire" | < Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables | | |
| | | | | | At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present. | | | |
| | | | | | Ratio of Unrecog/Recog | >0.60 | discard 100 engine cycle test | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ********** | ********** | ********** | |
| | | | | | NON-CRANKSHAFT BASED ROUGH ROAD: | Disabled | | |
| | | | | | Rough Road Source****** | CeRRDR_e_None****** ** ********** | ********** | |
| | | | | | IF Rough Road Source = WheelSpeedInECM | **> WSSRoughRoadThres** | | |
| | | | | | (Wheel speed noise | active | discard 100 | |
| | | | | | GRABS = | active | engine cycle test | |
| | | | | | OR Traction = | active | | |
| | | | | | OR Vehicle Stability) = | | | |
| | | | | | AND No Emission Neutral Default Action DTCs | ABS Failed<br>Vehicle Dynamics Control System Status<br>Driven Wheel Rotation Status<br>Non Driven Wheel Rotation Status | | |
| | | | | | ********** | ********** | ********** | |
| | | | | | IF Rough Road Source = "FromABS" | detected | | |
| | | | | | (RoughRoad = | active | discard 100 | |
| | | | | | GRABS = | active | engine cycle test | |
| | | | | | OR Traction = | active | | |
| | | | | | OR Vehicle Stability) = | | | |
| | | | | | AND No Emission Neutral Default Action DTCs | ABS Failed<br>Vehicle Dynamics Control System Status | | |
| | | | | | ********** | ********** | ********** | |
| | | | | | IF Rough Road Source = "TOSS" | **>TOSSRoughRoadThres** in supporting tables | discard 100 engine cycle test | |
| | | | | | TOSS dispersion | Transmission Output Shaft Angular Velocity Validity | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND No Active DTCs<br><br>**********<br><br>Default Action<br><br>Isolator Resonance Default Action Option<br>**********<br><br>If Isolator Resonance Option Enabled<br>AND<br>Misfire P030xTFTKO | TransmissionEngagedState_FA<br>(Auto Trans only)<br>ClutchPstnSnsr FA<br>(Manual Trans only)<br><br>**********<br><br>Not Enabled<br>**********<br><br>Set engine speed limits:<br>0 < Eng RPM < 9,000 | 4 cycle delay<br><br>**********<br><br>**********<br><br>********** | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position System Variation Not Learned | P0315 | This DTC determines if the crankshaft sensor learn values that are stored in memory are valid. The angle between each tooth of the reluctor wheel is learned, and the sum of all angles together should sum to 360° (one revolution of the reluctor wheel). Default values, or corrupted values will not sum to 360°. | The Crankshaft target wheel should be 360 degrees around in circumferance. Loss or controller non-volitile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect.<br><br>Set the DTC if the Differance between the sum of the reluctor wheel's teeth and 360 degrees is greater than: | > 0.001 degrees | OBD Manufacturer Enable Counter | MEC = 0 | 0.50 seconds<br><br>Frequency Continuous100 msec | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Performance Per Cylinder | P0324 | This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to Excessive Knock (either real or false knock). In the knock detection algorithm, the term “Knock Intensity” (KI) is used to define the relative size of a knock event, and is calculated as (KI = current knock event - knock threshold). This results in a KI amplitude that is proportional to the size of the knock event (as seen by the knock sensor). In addition, Knock Intensity cannot be less than zero as it is forced/limited to be = 0 with no knock detected (i.e. whenever the current knock event < knock threshold, KI = 0). This diagnostic calculates a first-order lag filter version of the Knock Intensity and sets a fault when: (Filtered KI) > (Excessive Knock Diagnostic Threshold) | Filtered Knock Intensity<br><br>(where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock) | **> P0324_PerCyl_ExcessiveKnock_Threshold**<br>(no units) | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Engine Air Flow<br><br>Engine Coolant Temperature<br><br>or<br><br>OBD Coolant Enable Criteria<br><br>Inlet Air Temperature<br><br>Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle) | Yes<br><br>> 2.0 seconds<br><br>> 400 RPM<br>AND<br>< 8,500 RPM<br><br>>200 mg/cylinder<br>AND<br>< 2,000 mg/cylinder<br><br>> -40 deg's C<br><br>= TRUE<br><br>> -40 deg's C<br><br>> 80 revs | First Order Lag Filters with Weight Coefficient = 0.0500<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit Bank 1 | P0325 | This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used:<br><br>**1.20 kHz Method:**<br>This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either:<br>A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs)<br>or<br>B, High output for an Open Circuit (because | Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise):<br><br>Filtered FFT Output<br><br>Filtered FFT Output | =<br>**P0325_P0330_OpenMethod_2**<br><br>**<u>Case 1 (20 kHz Method):</u>**<br><br>**>**<br>**P0325_P0330_OpenCktThrshMin (20 kHz)**<br>**AND**<br>**<**<br>**P0325_P0330_OpenCktThrshMax (20 kHz)**<br><br>**<u>Case 2 (Normal Noise Method):</u>**<br><br>**>**<br>**P0325_P0330_OpenCktThrshMin (Normal Noise)**<br>**AND**<br>**<**<br>**P0325_P0330_OpenCktThrshMax (Normal Noise)** | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)<br><br>Engine Air Flow<br><br>Engine Coolant Temperature<br><br>or<br><br>OBD Coolant Enable Criteria<br><br>Inlet Air Temperature | Yes<br><br>> 2.0 seconds<br><br>> 400 RPM<br>and<br>< 8,500 RPM<br><br>> 102 revs<br><br>> 10 mg/cylinder<br>and<br>< 2,000 mg/cylinder<br><br>> -40 deg's C<br><br>= TRUE<br><br>> -40 deg's C | First Order Lag Filter with Weight Coefficient<br><br>Weight Coefficient = 0.0100<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | the 20 kHz injected signal is detected only on one of the sensor inputs).<br>The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only.<br><br>2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold.<br><br>See Supporting Tables for method definition: **P0325_P0330_OoenM** | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | **ethod** defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations:<br>A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or<br>B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Performance Bank 1 | P0326 | This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an abnormally low output due to being unattached (or loosely attached) with the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold. | Filtered FFT Intensity<br><br>(where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency)<br><br>Filtered FFT Intensity | **<u>Case 1</u>: Engine <u>not</u> in AFM mode**<br><br>< **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table)<br><br>OR<br><br>**<u>Case 2:</u> Engine js in AFM mode**<br><br>< **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table; Engine is in AFM mode) | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Engine Air Flow<br><br>Engine Coolant Temperature<br><br>or<br><br>OBD Coolant Enable Criteria<br><br>Inlet Air Temperature<br><br>Individual Cylinders enabled for Abnormal Noise<br><br>Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle) | Yes<br><br>> 2.0 seconds<br><br>>2,150 RPM (not in AFM mode)<br>OR<br>> 2,100 (in AFM mode)<br><br>AND<br>< 8,500 RPM<br><br>> 300mg/cylinder<br>AND<br>< 2,000 mg/cylinder<br><br>> -40 deg's C<br><br>= TRUE<br><br>> -40 deg's C<br><br>**P0326_P0331-AbnormalNoiseCylsEnabled** (Supporting Table)<br><br>> 232 Revs | First Order Lag Filters with Weight Coefficient =<br><br>0.0050<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit Low Bank 1 | P0327 | This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage. | Sensor Input or Return Signal Line | < 8.0 Percent<br><br>(of 5.0 Volt reference) | Diagnostic Enabled?<br><br>Engine Speed | Yes<br><br>> 0 RPM<br>and<br>< 8,500 RPM | 50 Failures<br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit High Bank 1 | P0328 | This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage. | Sensor Input or Return Signal Line | > 39.0 Percent<br><br>(of 5 Volt Reference) | Diagnostic Enabled?<br><br>Engine Speed | Yes<br><br>> 0 RPM<br>and<br>< 8,500 RPM | 50 Failures<br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit Bank 2 | P0330 | This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2<br>There are two possible methods used:<br><br>**1.20 kHz Method:**<br>This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either:<br><br>A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs)<br>or<br>B, High output for an | **Individual Sensor Thresholds Enabled?**<br><br>**Open Circuit Method chosen** (2 possible methods: 20 kHz or Normal Noise):<br><br>Filtered FFT Output<br><br>Filtered FFT Output | = o,<br>Use Case 1 and 2<br><br>= **P0325_P0330_OpenMethod_2**<br><br>(supporting table)<br><br>**<u>Case 1 (20 kHz Method):</u>**<br><br>**> P0325_P0330_OpenCktThrshMin (20 kHz) AND**<br>**< P0325_P0330_OpenCktThrshMax (20 kHz)**<br><br>**<u>Case 2 (Normal Noise Method):</u>**<br><br>**> P0325_P0330_OpenCktThrshMin (Normal Noise) AND**<br>**< P0325_P0330_OpenCktThrshMax (Normal Noise)**<br><br>**Case 3 (20 kHz Method):** | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)<br><br>Engine Air Flow<br><br>Engine Coolant Temperature<br><br>or<br><br>OBD Coolant Enable Criteria<br><br>Inlet Air Temperature | Yes<br><br>> 2.0 seconds<br><br>> 400 RPM<br>and<br>< 8,500 RPM<br><br>≥102 revs<br><br>> 10 mg/cylinder<br>and<br>< 2,000 mg/cylinder<br><br>> -40 deg's C<br><br>= TRUE<br><br>> -40 deg's C | First Order Lag Filter with Weight Coefficient<br><br>**Case 1 & 2:**<br>Weight Coefficient = 0.0100<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Open Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs).<br><br>The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only.<br><br>2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold.<br><br>See Suooortinq Tables | Filtered FFT Output<br><br>Filtered FFT Output | >**P0330_OpenCktThrshMin2 (20 kHz)**<br><br>AND<br><br><**P0330_OpenCktThrshMax2 (20kHz)**<br><br>**Case 4 (Normal Noise Method):**<br><br>>**P0330_OpenCktThrshMin2 (NN)**<br><br>AND<br><br><**P0330_OpenCktThrshMax2 (NN)** | | | **Case 3 & 4** Weight Coefficient = 0.01<br><br>Updated each engine event | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | for method definition: **P0325_P0330_OpenMethod** defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM).<br>Typical implementations:<br>A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or<br>B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM<br><br>For each method the failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Performance Bank 2 | P0331 | This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an Abnormally low output due to being unattached (or loosely attached) with the the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold.<br><br>The failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor. | Individual Sensor Thresholds Enabled?<br><br>Filtered FFT Intensity<br><br>(where 'FFT Intensity' = Non-knocking, background engine noise)<br><br>Filtered FFT Intensity | = o,<br>Use Case 1 and 2<br><br>**Case** 1: **Engine <u>not</u> in AFM mode**<br>< **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table)<br><br>OR<br><br>**Case 2: Engine js in AFM mode**<br>< **P0326_P0331_AbnormalNoise_Thresh_AFM**<br><br>(Supporting Table)<br><br>**Case 3: Engine not in AFM mode**<br><br>< **P0331_AbnormalLo2** (Supporting Table)<br><br>OR<br><br>**Case 4: Engine is in AFM mode**<br>< **P0331_AbnormalLoAFM_2** (Supporting Table) | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Engine Air Flow<br><br>Engine Coolant Temperature<br><br>or<br><br>OBD Coolant Enable Criteria<br><br>Inlet Air Temperature<br><br>Individual Cylinders enabled for Abnormal Noise<br><br>Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle) | Yes<br><br>> 2.0 seconds<br><br>>2,150 RPM (not in AFM mode)<br>OR<br>> 2,100 (in AFM mode)<br><br>AND<br>< 8,500 RPM<br><br>> 300mg/cylinder<br>AND<br>< 2,000 mg/cylinder<br><br>> -40 deg's C<br><br>= TRUE<br><br>> -40 deg's C<br><br>**P0326_P0331-AbnormalNoiseCylsEnabled** (Supporting Table)<br><br>>232 Revs | First Order Lag Filter with Weight Coefficient<br><br>**Case 1 & 2:** Weight Coefficient = 0.0100<br><br>Updated each engine event<br><br>**Case 3 & 4:** Weight Coefficient = 0.01<br><br>Updated each engine eventFirst | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit Low Bank 2 | P0332 | This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage. | Sensor Input or Return Signal Line | < 8.0 Percent<br><br>(of 5 Volt Reference) | Diagnostic Enabled?<br><br>Engine Speed | Yes<br><br>> 0 RPM<br>and<br>< 8,500 RPM | 50 Failures<br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Knock Sensor (KS) Circuit High Bank 2 | P0333 | This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage. | Sensor Input or Return Signal Line | > 39.00 Percent<br><br>(of 5 Volt Reference) | Diagnostic Enabled?<br><br>Engine Speed | Yes<br><br>> 0 RPM<br>and<br>< 8,500 RPM | 50 Failures<br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position (CKP) SensorA Circuit | P0335 | Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass. | Time since last crankshaft position sensor pulse received | >= 4.0 seconds | Starter engaged<br>AND<br>(cam pulses being received<br>OR<br>( MAF_SensorFA<br>AND<br>Engine Air Flow | Testis Enabled<br>= FALSE<br>> 3.0 grams/second ) ) | Continuous every 100 msec | Type B, 2 Trips |
| | | | No crankshaft pulses received | >= 0.1 seconds | Engine is Running<br>Starter is not engaged | Testis Enabled | Continuous every 12.5 msec | |
| | | | No crankshaft pulses received | | Engine is Running<br>OR<br>Starter is engaged<br>No DTC Active: | Testis Enabled<br>P0340<br>P0341 | 2 failures out of 10 samples<br>One sample per engine revolution | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position (CKP) SensorA Performance | P0336 | 1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen. | Time in which 10 or more crank re-synchronizations occur | < 10.0 seconds | Engine Air Flow<br>Cam-based engine speed<br>No DTC Active: | Testis Enabled<br>>= 3.0 grams/second<br>> 450 RPM<br>P0335 | Continuous every 250 msec | Type B, 2 Trips |
| | | | No crankshaft synchronization gap found | >= 0.4 seconds | Engine is Running<br>Starter is not engaged | Testis Enabled | Continuous every 12.5 msec | |
| | | | Time since starter engaged without detecting crankshaft synchronization gap | >= 3.3 seconds | Starter engaged<br>AND<br>(cam pulses being received<br>OR<br>( MAF_SensorFA<br>AND<br>Engine Air Flow | Testis Enabled<br>= FALSE<br>> 3.0 grams/second ) ) | Continuous every 100 msec | |
| | | | Crank pulses received in one engine revolution<br>OR<br>Crank pulses received in one engine revolution | < 1 pulses<br>> 65,535 pulses | Engine is Running<br>OR<br>Starter is engaged<br>No DTC Active: | Testis Enabled<br>P0340<br>P0341 | 8 failures out of 10 samples<br>One sample per engine revolution | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A | P0340 | Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass. | Time since last camshaft position sensor pulse received<br><br>OR<br><br>Time that starter has been engaged without a camshaft sensor pulse | >= 5.5 seconds<br><br>>= 4.0 seconds | Starter engaged<br>AND<br>(crank pulses being received<br>OR<br>( MAF_SensorFA<br>AND<br>Engine Air Flow | Testis Enabled<br><br>= FALSE<br><br>> 3.0 grams/second ) ) | Continuous every 100 msec | Type B, 2 Trips |
| | | | Fewer than 4 camshaft pulses received in a time | > 3.0 seconds | Engine is running<br><br>Starter is not engaged | Testis Enabled | Continuous every 100 msec | |
| | | | No camshaft pulses received during 24 MEDRES events<br><br>(There are 24 MEDRES events per engine cycle)<br><br>Test begins when MEDRES region<br>AND<br>accumulated number of MEDRES events | = region 6<br><br>>= 0 counts | Crankshaft is synchronized<br><br>Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged<br><br>No DTC Active: | Testis Enabled<br><br>CrankSensor_FA | Continuous, every MEDRES event unitl test completes, one test at every start attempt | |
| | | | The number of camshaft pulses received during 100 engine cycles | = 0 pulses | Crankshaft is synchronized<br><br>No DTC Active: | Testis Enabled<br><br>CrankSensor_FA | 8 failures out of 10 samples<br><br>Continuous every engine cycle | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Camshaft Position (CMP) Sensor Performance Bank 1 SensorA | P0341 | Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct. | The number of camshaft pulses received during 24 MEDRES events is OR<br><br>(There are 24 MEDRES events per engine cycle)<br><br>Test begins when MEDRES region AND accumulated number of MEDRES events | < 4 pulses<br>> 8 pulses<br><br>= region 6<br><br>>= 0 counts | Crankshaft is synchronized<br><br>Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged<br><br>No DTC Active: | Testis Enabled<br><br>CrankSensor_FA | Continuous, every MEDRES event unitl test completes, one test at every start attempt | Type B, 2 Trips |
| | | | The number of camshaft pulses received during 100 engine cycles OR | < 398 pulses<br>> 402 pulses | Crankshaft is synchronized<br><br>No DTC Active: | Testis Enabled<br><br>CrankSensor_FA | 8 failures out of 10 samples<br><br>Continuous every engine cycle | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position Sensor - Crankshaft Start Position Incorrect | P034A | Monitors the position of the crankshaft during auto-start's to verify that the crankshaft is in the expected position- diagnostic will fail if the crankshaft is not in the expected range otherwise the diagnostic will pass | Crankshaft position is in error by a number of crankshaft wheel teeth | > 1 crankshaft teeth | Engine has started rotating during a hybrid auto-start<br><br>Crankshaft position is being verified<br><br>No Active DTCs: | Testis Enabled<br><br>CrankSensor_FA | 2 failures out of 3 samples<br><br>a sample occurs at each hybrid auto-start | Type B, 2 Trips |
| | | | Crankshaft position is in error by at least one crankshaft wheel tooth | | Engine has started rotating during a hybrid auto-start<br><br>Crankshaft position is being verified<br><br>No Active DTCs: | Testis Enabled<br><br>CrankSensor_FA | 4 failures out of 5 samples<br><br>a sample occurs each hybrid auto-start | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Crankshaft Position Sensor - Crankshaft Direction Incorrect | P034B | Detects if the crankshaft is not rotating in the correct direction- will fail if the engine is reported to be spinning backwards while the engine is running otherwise the diagnostic will pass. | Number of crankshaft sensor reversals<br><br>within a period of time | >= 3 pulses<br><br><= 10.0 seconds | Engine Speed<br>Engine Speed<br>Engine Air Flow<br><br>Engine Movement Detected<br><br>No Active DTCs: | Testis Enabled<br><br>> 400 RPM<br>< 2,000 RPM<br>>= 3.0 grams/second<br><br>CrankSensor_FA | Continuous<br><br>Every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #1 CIRCUIT | P0351 | Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures<br><br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #2 CIRCUIT | P0352 | Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures<br><br>out of<br>63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #3 CIRCUIT | P0353 | Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #4 CIRCUIT | P0354 | Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #5 CIRCUIT | P0355 | Diagnoses Cylinder #5 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #6 CIRCUIT | P0356 | Diagnoses Cylinder #6 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #7 CIRCUIT | P0357 | Diagnoses Cylinder #7 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #8 CIRCUIT | P0358 | Diagnoses Cylinder #8 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 30 kQ impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Catalyst System Low Efficiency Bank 1 | P0420 | NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm<br><br>Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (l.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions<br><br>Normalized Ratio OSC Value Calculation Information and Definitions =<br>1. Raw OSC Calculation = (post cat 02 Resp time - pre cat 02 Resp time)<br>2. BestFailing OSC value from a calibration | Normalized Ratio OSC Value<br>The EWMA calculation uses a 0.16 coefficient. | < 0.35 | Diagnostic is Enabled<br><br>All enable criteria associated with P0420 can be found under P2270- (02 Sensor Signal Stuck Lean Bank 1 Sensor 2)<br><br>Rapid Step Response (RSR) feature will initiate multiple tests:<br><br>If the difference between current EWMA value and the current OSC Normalized Ratio value is<br><br>and the current OSC Normalized Ratio value is<br><br>Maximum number of RSR tests to detect failure when RSR is enabled.<br><br>MAF<br><br>Predicted catalyst temperature<br><br>Front 02 Sensor<br>or<br>Front WRAF<br><br>Rear 02 Sensor<br><br>General Enable Criteria<br><br>In addition to the p-codes | <br><br><br><br><br><br><br><br><br><br><br>>0.52<br><br><0.13<br><br>9<br><br><br><br>> 2.00 g/s<br>< 16.00 g/s<br><br>< 845 ° C<br><br>>680.00 mV<br>or<br>>1.05EQR<br><br>>825.00 mV | 1 test attempted per valid decel period<br><br>Minimum of 1 test per trip<br><br>Maximum of 6 tests per trip<br><br>Frequency: Fueling Related : 12.5 ms<br><br>OSC Measurements: 100 ms<br><br>Temp Prediction: 12.5ms | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | table (based on temp and exhaust gas flow)<br>3. WorstPassing OSC value (based on temp and exhaust gas flow)<br><br>Normalized Ratio Calculation = (1-2) / (3-2)<br><br>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.<br><br>Refer to the **P0420_WorstPassingOSCTableBI** and **P0420_BestFailingOSCTableBI** in Supporting Tables tab for details<br><br>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 1 Sensor 2 test(P2270). Several conditions must be met in order to execute this test.<br><br>Additional conditions and their related values | | | listed under P2270, the following DTC's shall also not be set:<br><br>For switching 02 sensors:<br><br>For WRAF 02 sensors: | O2S_Bank_1_Sensor_1_FA<br>02S _Bank_1_Sensor_2_FA<br>02S _Bank_2_Sensor_1_FA<br>O2S_Bank_2_Sensor_2_FA<br><br>WRAF_Bank_1_FA<br>WRAF_Bank_2_FA<br><br>**P0420_WorstPassingOSCTableBI**<br><br>**P0420_BestFailingOSCTableBI** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (02 Sensor Signal Stuck Lean Bank 1 Sensor 2) | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Catalyst System Low Efficiency Bank 2 | P0430 | Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm<br><br>Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (l.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions<br><br>Normalized Ratio OSC Value Calculation Information and Definitions =<br>1. Raw OSC Calculation = (post cat 02 Resp time - pre cat 02 Resp time)<br>2. BestFailing OSC value from a calibration | Normalized Ratio OSC Value<br>The EWMA calculation uses a 0.16 coefficient. | < 0.35 | Diagnostic is Enabled<br><br>All enable criteria associated with P0430 can be found under P2272- (02 Sensor Signal Stuck Lean Bank 2 Sensor 2)<br><br>Rapid Step Response (RSR) feature will initiate multiple tests:<br><br>If the difference between current EWMA value and the current OSC Normalized Ratio value is<br><br>and the current OSC Normalized Ratio value is<br><br>Maximum number of RSR tests to detect failure when RSR is enabled.<br><br>MAF<br><br>Predicted catalyst temperature<br><br>Front 02 Sensor<br>or<br>Front WRAF<br><br>Rear 02 Sensor<br><br>General Enable Criteria<br><br>In addition to the p-codes | <br><br><br><br><br><br><br><br><br><br>>0.50<br><br><br><br><0.13<br><br><br>9<br><br><br><br>> 2.00 g/s<br>< 16.00 g/s<br><br><845 °C<br><br>>680.00 mV<br>or<br>>1.05EQR<br><br>> 825.00 mV | 1 test attempted per valid decel period<br><br>Minimum of 1 test per trip<br><br>Maximum of 6 tests per trip<br><br>Frequency: Fueling Related : 12.5 ms<br><br>OSC Measurements: 100 ms<br><br>Temp Prediction: 12.5ms | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | table (based on temp and exhaust gas flow)<br>3. WorstPassing OSC value (based on temp and exhaust gas flow)<br><br>Normalized Ratio Calculation = (1-2) / (3-2)<br><br>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.<br><br>Refer to the **P0430_WorstPassing OSCTableB2** and **P0430_BestFailingOS CTableB2** in Supporting Tables tab for details<br><br>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 2 Sensor 2 test(P2272). Several conditions must be met in order to execute this test.<br><br>Additional conditions and their related values | | | listed under P2272, the following DTC's shall also not be set:<br><br>For switching 02 sensors:<br><br>For WRAF 02 sensors: | O2S_Bank_1_Sensor_1_FA<br>02S _Bank_1_Sensor_2_FA<br>02S _Bank_2_Sensor_1_FA<br>O2S_Bank_2_Sensor_2_FA<br><br>WRAF_Bank_1_FA<br>WRAF_Bank_2_FA<br><br>**P0430_WorstPassingOS CTableB2**<br><br>**P0430_BestFailingOSCT ableB2** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2272 (02 Sensor Signal Stuck Lean Bank 2 Sensor 2) | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP) System Small Leak Detected<br><br>(No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - with Fuel Tank Zome Module (FTZM)) | P0442 | This DTC will detect a small leak (> 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as > 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When | The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see **P0442 EONV Pressure Threshold (Pascals)** in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).<br><br>When EWMA is<br><br>the DTC light is illuminated.<br><br>The EWMA calculation uses a 0.13 weighting coefficient.<br><br>The DTC light can be turned off if the EWMA is<br><br>and stays below the EWMA fail threshold for 3 additional consecutive trips. | <br><br><br>

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | the pressure drops ( -62 ) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort. | | | Ambient Temperature Using OAT Sensor to be Va<br>***1 **********<br><br>1. Startup OAT is less than previous trip EAT<br><br>OR<br>2. Startup EOT - previous trip EAT<br><br>OR<br>3. Engine off time<br><br>OR<br>4. At startup, time since previous EAT valid and able to learn<br><br>OR<br>5. EAT - current OAT<br><br>OR<br>6. EAT < current OAT and speed timer<br>and current OAT - EAT<br><br>Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows:<br><br>vehicle speed < 10mph<br>10 mph<speed< 35 mph<br>35mph<speed<124<br>124mph<speed< 124<br><br>Speed timer can never be less than 0 seconds<br>**********<br><br>_1. High Fuel Volatility____ | <br><br>**********<br><br><br><br><br><br><br>< 0 °C<br><br><br><br>> 3,600 seconds<br><br><br><br><br><br>< 3,600 seconds<br><br><br>0 °C < difference < 2 °C<br><br><br>> 240 seconds<br><br>< 2 °C<br><br><br><br><br><br><br>-0.2 seconds<br>0.10 seconds<br>0.33 seconds<br>0.33 seconds<br><br><br><br>********** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables.<br><br>OR<br>2. Vacuum Refueling Detected<br><br>See P0454 Fault Code for information on vacuum refueling algorithm.<br><br>OR<br>3. Fuel Level Refueling Detected<br><br>See P0464 Fault Code for information on fuel level refueling.<br><br>OR<br>4. Vacuum Out of Range and No Refueling<br><br>See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for | < -5 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | information on fuel level refueling.<br><br>OR<br>5. Vacuum Out of Range and Refueling Detected<br><br>See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.<br><br>OR<br>6. Vent Valve Override Failed<br><br>Device control using an off-board tool to control the vent solenoid, cannot exceed<br>during the EONV test<br><br>OR<br>7. Key up during EONV test<br><br>No active DTCs:<br><br>No Active DTCs TFTKO | 0.50 seconds<br><br>MAF_SensorFA<br>ECT_Sensor_FA<br>IAT_SensorFA<br>VehicleSpeedSensor_FA<br>ModuleOffTime_FA<br>AmbientAirDefault<br>FuelLevelDataFault<br><br>P0443<br>P0446<br>P0449<br>P0452<br>P0453<br>P0455 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0458<br>P0459<br>P0498<br>P0499<br>P0496<br>P1001<br>P1005<br>P11FF<br>P130F<br>U18A2 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0443 | Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedance between output and controller ground. | Diagnostic is Enabled<br><br>Powertrain relay voltage | Voltage >11.0 volts | 20 failures out of 25 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controller s P0458 may also set (Canister Purge Solenoid Short to Ground) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP) Vent System Performance<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0446 | This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister.<br><br>This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold. | Vent Restriction Prep Test:<br>Vented Vacuum<br>for<br>OR<br>Vented Vacuum<br>for<br><br>Vent Restriction Test:<br>TankVacuum<br>for<br>before Purge Volume<br><br>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time. | < -623 Pa<br>60 seconds<br><br>> 1,245 Pa<br>60 seconds<br><br>> 3,487 Pa<br>5 seconds<br>> 8 liters | Diagnostic is Enabled<br><br>Fuel Level<br>System Voltage<br>Startup IAT<br>Startup ECT<br>BARO<br><br>No active DTCs:<br><br>No Active DTCs TFTKO | 10 % < Percent < 90%<br>> 10.0 volts<br>4 °C<Temperature<35 °C<br><35 °C<br>>70 kPa<br><br>MAP_SensorFA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>EnginePowerLimited<br>FuelLevelDataFault<br><br>P0443<br>P0449<br>P0452<br>P0453<br>P0454<br>P0458<br>P0459<br>P0498<br>P0499<br>P1001<br>P1005<br>P11FF<br>P130F<br>U18A2 | Once per Cold Start<br><br>Time is dependent on driving conditions<br><br>Maximum time before test abort is 1,400 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP)Vent Solenoid Control Circuit (ODM)<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0449 | Controller specific output driver circuit diagnoses the vent solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | > 200 K Q impedence between output and controller ground | Diagnostic is Enabled<br><br>No active DTCs: | P1005<br>P130F<br>U18A2 | 50 failures out of 63 samples<br><br>100 ms /sample | Type B, 2 Trips<br><br>Note: In certain controlle rs P0498 may also set (Vent Solenoid Short to Ground) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Tank Pressure (FTP) Sensor Circuit Performance<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0451 | The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.<br><br>During the EONV test, the fuel tank vacuum sensor is re-zeroed.<br>A re-zero occurs:<br>1) At the transition from the volatility phase to the pressure phase.<br>2) At the transition from the pressure phase to the vacuum phase.<br><br>The re-zero test determines if the tank vacuum signal falls within a calibratable window about atmospheric pressure. If after some time, the tank vacuum signal does not fall to within the window, the re-zero test exits to the refueling rationality test.<br><br>The refueling rationality test determines if a refueling event caused the re-zero problem. If so, the re-zero problem is ignored. If a refueling event is not | The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts)<br><br>Upper voltage threshold (voltage addition above the nominal voltage)<br><br>Lower voltage threshold (voltage subtraction below the nominal voltage)<br><br>The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail).<br><br>When EWMA is<br><br>the DTC light is illuminated.<br><br>The EWMA calculation uses a 0.20 weighting coefficient.<br><br>The DTC light can be turned off if the EWMA is<br><br>and stays below the | 0.2 volts<br><br>0.2 volts<br><br>> 0.73 (EWMA Fail Threshold),<br><br><0.40 (EWMA Re-Pass Threshold) | This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes | | This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. | Type A, 1 Trips<br><br>EWMA<br><br>Average run length: 6<br>Run length is 2 trips after code clearer non-volatile reset |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | detected, then the results of the re-zero test are used to determine if there is a re-zero problem.<br>1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0.<br>2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure.<br>3) A ratio of 1.0 means that the re-zero pressure did not get within the window.<br>4) Re-zero pressure within the window generates values between 0.0 and 1.0.<br><br>If a refueling event is not detected, then the resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the vacuum re-zero test reports a failure. Once the vacuum re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the vacuum re-zero test again. | EWMA fail threshold for 3 additional consecutive trips. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0452 | This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range.<br><br>The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.<br><br>If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold. | FTP sensor signal<br><br>The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts<br>(- -3736 Pa). | < 0.15volts (3.0 % of Vref or -1,495 Pa) | No active DTC's: | P1001<br>P1005<br>U18A2 | 640 failures out of 800 samples<br><br>12.5 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Tank Pressure (FTP) Sensor Circuit High Voltage<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0453 | This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.<br><br>The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.<br><br>If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold. | FTP sensor signal<br><br>The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts<br>(~ -3736 Pa). | > 4.85 volts (97.0 % of Vref or - -3,985 Pa) | No active DTCs: | P1001<br>P1005<br>U18A2 | 640 failures out of 800 samples<br><br>12.5 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Tank Pressure (FTP) Sensor Circuit Intermittent<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0454 | This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.<br><br>During the EONV test, an abrupt change in fuel tank vacuum is identified as a possible refueling event. If the abrupt change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts.<br><br>If the refueling rationality test detects a refueling event, then the vacuum change is considered “rational.” If the refueling rationality test does not detect a refueling event, then the vacuum change is considered “irrational.”<br><br>The vacuum change rationality diagnostic is an “X out of Y” test.<br>1) Each time the EONV test completes, the (Y) sample counter is incremented.<br>2) Each time the | If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test. | > 112 Pa<br><br>< 249 Pa<br><br>>10% | This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed | | This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures.<br><br>12.5 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | rationality test has an irrational result; the (X) fail counter is incremented.<br>3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the vacuum change rationality test fails.<br>4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the vacuum change rationality test passes. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP) System Large Leak Detected<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0455 | This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system.<br><br>This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level.<br><br>The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds.<br><br>If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected.<br><br>On fuel systems with fuel caps<br><br>If the first failure of | Purge volume while Tankvacuum<br><br>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.<br><br>Weak Vacuum Follow-up Test (fuel cap replacement test)<br>Weak Vacuum Testfailed.<br><br>Passes if tank vacuum<br><br>Note: Weak Vacuum Follow-up Test can only report a pass. | > 9 liters<br><br>< 2,740 Pa<br><br>> 2,740 Pa | Diagnostic is Enabled<br><br>Fuel Level<br>System Voltage<br>BARO<br>Purge Flow<br><br>No active DTCs:<br><br>No Active DTCs TFTKO<br><br>If ECT > IAT, Startup temperature delta (ECT-IAT):<br>Startup IAT<br>Startup ECT<br><br>Weak Vacuum Follow-up Test<br>This test can run following | 10 % < Percent < 90 %<br>> 10.0 volts<br>> 70 kPa<br>> 2.50%<br><br>MAP_SensorFA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>EnginePowerLimited<br>FuelLevelDataFault<br><br>P0443<br>P0449<br>P0452<br>P0453<br>P0454<br>P0458<br>P0459<br>P0498<br>P0499<br>P1001<br>P1005<br>P11FF<br>P130F<br>U18A2<br><br>< 8 °C<br>4 °C<Temperature<35 °C<br>< 35 °C | Once per cold start<br><br>Time is dependent on driving conditions<br><br>Maximum time before test abort is 1,400 seconds<br><br>Weak Vacuum Follow-up Test<br><br>With large leak detected, the follow-up test is limited toO seconds. Once the MIL is on, the follow-up test runs indefinitely. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | P0455 occurred after a refueling event was detected and the MIL is off for P0455, the MIL will be commanded off after the first pass of P0455 is reported. If the first failure of P0455 did not occur after a refueling event was detected, the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.<br><br>On fuel systems without fuel caps<br><br>The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported. | | | a weak vacuum failure or on a hot restart. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission System Purge Control Valve Circuit Low<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0458 | Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedence between output and controller ground | Diagnostic is Enabled<br><br>Powertrain relay voltage | Voltage >11.0 volts | 20 failures out of 25 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controller s P0443 may also set (Canister Purge Solenoid Open Circuit) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission System Purge Control Valve Circuit High<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0459 | Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedence between output and controller power | Diagnostic is Enabled<br><br>Powertrain relay voltage | Voltage >11.0 volts | 20 failures out of 25 samples<br><br>250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Level Sensor 1 Performance<br><br>(For use on vehicles with a single fuel tank) | P0461 | This DTC will detect a primary fuel tank level sensor stuck in-range. | a) Sensed fuel volume change is<br>b) while engine fuel consumption is | a) < 3 liters<br><br>b) > 27.81 liters | 1. Diagnostic Enabled<br><br>2. Engine Operational State | 1. == True<br><br>2. == Running | 250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected to an FTZM) | P0462 | This DTC will detect a primary fuel tank sensor out-of-range low. | Fuel level Sender % of 5V range | <10% | a) Diagnostic enabled status<br>b) Fuel Level Sensor Initialized status<br>c) Fuel Level Sensor Data Available Status<br>d) Communication faults status | a) — True<br>b) == True<br>c) == True<br>d) <> True | 40 failures out of 50 samples<br><br>250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float connected to an FTZM) | P0463 | This DTC will detect a primary fuel tank level sensor out-of-range high. | Fuel level Sender % of 5V range | > 60 % | a) Diagnostic enabled status<br>b) Fuel Level Sensor Initialized status<br>c) Fuel Level Sensor Data Available Status<br>d) Communication faults status | a) — True<br>b) == True<br>c) == True<br>d) <> True | 40 failures out of 50 samples<br>250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Level Sensor 1 Circuit Intermittent<br><br>(No ELCP - Conventional EVAP Diagnostic) | P0464 | This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.<br><br>During the EONV test, a change in fuel level is identified as a possible refueling event. If the change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts.<br><br>If the refueling rationality test detects a refueling event, the fuel level change is considered “rational.” If the refueling rationality test does not detect refueling, the fuel level change is considered “irrational.”<br><br>The fuel level change rationality diagnostic is an “X out of Y” test.<br>1) Each time the EONV test completes, the (Y) sample counter is incremented.<br>2) Each time the rationality test has an | If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, if a refueling event is not confirmed, then the test sample is considered failing which indicates an intermittent signal problem.<br><br>An intermittent fuel level signal problem is defined as:<br><br>The fuel level changes by<br>and does not remain<br>for 30 seconds during a 600 second refueling rationality test. | <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>>10%<br>>10% | This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes | | This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures.<br><br>100 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | irrational result; the (X) fail counter is incremented.<br>3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the fuel level change rationality test fails.<br>4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the fuel level change rationality test passes. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan Speed Low [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P0494 | Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision. | Measured Fan Speed | <= Speed Low Limit [Supporting Table] **P0494_LIN_Threshold** | a] Diagnostic Enabled<br>b] Configuration calibration for number of fans<br>c] Diagnostic System Disabled<br>d] Battery Voltage In-Range<br>e] LIN Bus based Fan Operation Enabled<br>f] LIN Bus Lost Communication Fault Active<br>g] LIN Bus Continuous Operation Fault Active<br>h] Fan Commanded On | a] == 1.00<br>[True if 1; False ifO]<br>b] >= 1 unit<br>c] <>True<br>d] > 11.00 volts<br>e] == TRUE<br>f] <>True<br>g] <>True<br>h] == TRUE | 16.00 failures/ 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission (EVAP) System Flow During Non-Purge<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0496 | This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.<br><br>This test checks for purge valve leaks to intake manifold vacuum such that there would always be a small amount of purge flow present. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated.<br><br>Additional Information<br><br>This diagnostic test detects purge valve leaks to intake manifold vacuum. It is not intended to detect purge valve leaks to the atmosphere which are monitored by the EONV small leak diagnostic (P0442).<br><br>The purge valve leak diagnostic exists to helps service replace | TankVacuum<br>for<br><br>Test time | > 2,491 Pa<br>5 seconds<br><br>< refer to **P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level** in Supporting Tables.<br><br>Test time only increments when engine vacuum > 10.0 kPa. | Diagnostic is Enabled<br><br>Fuel Level<br>System Voltage<br>BARO<br>Startup IAT<br><br>Startup ECT<br>Engine Off Time<br><br>No active DTCs:<br><br>No Active DTCs TFTKO | 10 % < Percent < 90 %<br>> 10.0 volts<br>>70 kPa<br>4 °C<Temperature<35 °C<br><br><35 °C<br>>28,800.0 seconds<br><br>MAP_SensorFA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>IAT_SensorFA<br>ECT_Sensor_FA<br>AmbientAirDefault<br>EnginePowerLimited<br>FuelLevelDataFault<br><br>P0443<br>P0449<br>P0452<br>P0453<br>P0454<br>P0458<br>P0459<br>P0498<br>P0499<br>P1001<br>P1005<br>P11FF<br>P130F<br>U18A2 | Once per cold start<br><br>Cold start: max time is 1,400 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | leaking purge valves that could otherwise be detected with the EONV small leak diagnostic (P0442). | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission System Vent Solenoid Control Circuit Low<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0498 | Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedence between output and controller ground | Diagnostic is Enabled<br><br>No active DTC's: | P1005<br>P130F<br>U18A2 | 50 failures out of 63 samples<br><br>100 ms /sample | Type B, 2 Trips<br><br>Note: In certain controlle rs P0449 may also set (Vent Solenoid Open Circuit) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Evaporative Emission System Vent Solenoid Control Circuit High<br><br>(No ELCP - Conventional EVAP Diagnostic - with Fuel TankZone Module (FTZM)) | P0499 | Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.<br><br>If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedence between output and controller power | Diagnostic is Enabled<br><br>No active DTC's: | P1005<br>P130F<br>U18A2 | 50 failures out of 63 samples<br><br>100 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Low Engine Speed Idle System | P0506 | This DTC indicates that actual engine speed is lower than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met | Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient<br><br>Filter coefficient | > 91.00 rpm<br><br>0.00300 | Baro<br><br>Coolant Temp<br><br>Engine run time<br><br>Ignition voltage<br><br>Time since gear change<br><br>Time since a TCC mode change<br><br>IAT<br><br>Vehicle speed<br><br>Commanded RPM delta<br><br>Idle time<br><br>For manual transmissions:<br>Clutch Pedal Position<br>or<br>Clutch Pedal Position | > 70 kPa<br><br>> 60 °C<br><br>> 30 sec<br><br>32 > volts > 11<br><br>> 3 sec<br><br>> 3 sec<br><br>> -20 °C<br><br>< 1.24 mph, 2kph<br><br>< 25 rpm<br><br>> 10 sec<br><br>> 12.00 pct<br><br>< 75.00 pct<br><br>PTC not active<br><br>Transfer Case not in 4WD LowState | Diagnostic runs in every 12.5 ms loop<br><br>Diagnostic reports pass or fail in 10 seconds once all enable conditions are met | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | No active DTCs | Off-vehicle device control (service bay control) must not be active.<br><br>following conditions not TRUE:<br>(VeTESR_e_EngSpdReqlntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)<br><br>Clutch is not depressed<br><br>TC_BoostPresSnsrFA<br>ECT_Sensor_FA<br>EnginePowerLimited<br>EGRValveCircuit_FA<br>EGRValvePerformance_FA<br>IAT_SensorCircuitFA<br>EvapFlowDuringNonPurge_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>EngineMisfireDetected_FA<br>IgnitionOutputDriver_FA<br>TPS_FA<br>TPS_Performance_FA<br>VehicleSpeedSensor_FA<br>FuelLevelDataFault<br>LowFuelConditionDiagnostic<br>Clutch Sensor FA<br>AmbPresDfltdStatus | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | All of the above met for Idle time | P2771<br><br>> 10 sec<br><br>The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle) | | |
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| High Engine Speed Idle System | P0507 | This DTC indicates that actual engine speed is higher than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met | Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient<br><br>Filter coefficient | < -182.00 rpm<br><br>0.00300 | Baro<br><br>Coolant Temp<br><br>Engine run time<br><br>Ignition voltage<br><br>Time since gear change<br><br>Time since a TCC mode change<br><br>IAT<br><br>Vehicle speed<br><br>Commanded RPM delta<br><br>For manual transmissions:<br>Clutch Pedal Position<br>or<br>Clutch Pedal Position | > 70 kPa<br><br>> 60 °C<br><br>> 30 sec<br><br>32 > volts > 11<br><br>> 3 sec<br><br>> 3 sec<br><br>> -20 °C<br><br>< 1.24 mph, 2kph<br><br>< 25 rpm<br><br>> 12.00 pct<br><br>< 75.00 pct<br><br>PTC not active<br><br>Transfer Case not in 4WD LowState<br><br>Off-vehicle device control (service bay control) must not be active. | Diagnostic runs in every 12.5 ms loop<br><br>Diagnostic reports pass or fail in 10 seconds once all enable conditions are met | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | following conditions not TRUE: (VeTESR_e_EngSpdReqlntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) | | |
| | | | | | | Clutch is not depressed | | |
| | | | | | No active DTCs | TC_BoostPresSnsrFA<br>ECT_Sensor_FA<br>EnginePowerLimited<br>EGRValveCircuit_FA<br>EGRValvePerformance_FA<br>IAT_SensorCircuitFA<br>EvapFlowDuringNonPurge_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>EngineMisfireDetected_FA<br>IgnitionOutputDriver_FA<br>TPS_FA<br>TPS_Performance_FA<br>VehicleSpeedSensor_FA<br>FuelLevelDataFaultLow<br>FuelConditionDiagnostic<br>Clutch SensorFA<br>AmbPresDfltdStatus<br>P2771 | | |
| | | | | | All of the above met | > 10 sec | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | for Idle time | The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Rough Idle | P050D | Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active. | Deceleration index vs. Engine Speed Vs Engine load<br><br>Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point.<br><br>Incomplete combustion identified by P0300 threshold tables: | (>Idle SCDAND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) | Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements)<br><br>OBD Manufacturer Enable Counter<br><br>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:<br><br>Catalyst Temperature<br>AND<br>Engine Coolant<br>AND<br>Engine Coolant<br>AND<br>Barometric Pressure<br>AND<br>NumCLOEvents<br><br>In addition, Dual Pulse Strategy Is Enabled and Active Per the following:<br><br>Engine Speed<br><br>Accel Position<br><br>Engine Run Time<br><br>For the engine speeds and loads in which Dual | = 0<br><br>< 550.00 degC<br><br>> -12.00degC<br><br><= 66.00 degC<br><br>>= 70.00 KPa<br><br>< 1.00<br><br>>= 550.00 RPM<br><= 2,000.00 RPM<br><br><= 0.00 Pct<br><br>< 100 seconds | Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.<br><br>Frequency: 100ms<br><br>Test completes after Dual Pulse is no longer active<br>OR<br>The first 500 engine cycles have been reached | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Pulse is active: | | | |
| | | | | | Dual Pulse Error induced misfires percentage | >= catalyst damaging misfire | | |
| | | | | | Dual Pulse Error induced misfires percentage | < 90% of the maximum achieveable catalyst damaging misfire. | | |
| | | | | | Engine Cycles | >= 50.00<br><501 | | |
| | | | | | The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: | | | |
| | | | | | Catalyst Temperature<br>AND<br>Engine Run Time | >= 800.00 degC<br><br>>= 1.00 seconds | | |
| | | | | | OR | | | |
| | | | | | Engine Run Time | > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit**<br><br>This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. | | |
| | | | | | OR | | | |
| | | | | | Barometric Pressure | < 70.00 KPa | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Dual Pulse Strategy will exit per the following: | | | |
| | | | | | Engine Speed | > 2,350.00 RPM | | |
| | | | | | OR | | | |
| | | | | | Accel Position | > 3.00 Pct | | |
| | | | | | Engine Run Time | >= 100 seconds | | |
| | | | | | Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied: | | | |
| | | | | | "Additional Dual Pulse Enabling Criteria": | | | |
| | | | | | Green Engine Enrichment | Not Enabled | | |
| | | | | | Misfire Converter Protection strategy | Not being requested | | |
| | | | | | Engine Metal Overtemp strategy | Not being requested | | |
| | | | | | Fuel control state | Open Loop | | |
| | | | | | Output State Control | Not being requested for fuel | | |
| | | | | | DOD Or DFCO | Not Active | | |
| | | | | | Power Enrichment | Not Active | | |
| | | | | | Dynamic Power Enrichment | Not Active | | |
| | | | | | Piston Protection | Not Active | | |
| | | | | | Hot Coolant Enrichment | Not Active | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Injector Flow Test<br><br>General Enable<br><br>DTC's Not Set: | Not Active<br><br><br><br>EngineMisfireDetected_FA<br>AcceleratorPedalFailure<br>ECT_Sensor_FA<br>IAT_SensorCircuitFA<br>MnfdTempSensorCktFA<br>CrankSensor_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>MAP_SensorFA<br>AnyCamPhaser_TFTKO<br>ClutchPstnSnsr FA<br>IAC_SystemRPM_FA<br>IgnitionOutputDriver_FA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>FuelInjectorCircuit TFTK0<br>FHPR_b_FRP_SnsrCkt_FA<br>FHPR_b_FRP_SnsrCkt_TFTKO<br>FHPR_b_PumpCkt_FA<br>FHPR b PumpCkt TFTK0<br>TransmissionEngagedState_FA<br>EngineTorqueEstInaccurate<br>FuelPumpRlyCktFA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Pressure (EOP) Sensor Performance - Single Stage Oil Pump | P0521 | Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure rationality diagnostic has two parts: engine runing test and engine off test.<br><br>The engine running test compares the sensed oil pressure to a mathematical prediction of oil pressure; while the engine off test checks for a biased high engine oil pressure sensor after the engine has stopped rotating. | **Single Stage Oil Pump EOP Sensor Test with Engine Running**<br><br>If enabled:<br><br><u>Tofail a currently passing test:</u><br><br>The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):<br><br><u>To pass a currently failing test:</u><br><br>The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.): | < -50.0 kPa<br>OR<br>> 50.0 kPa<br><br>> -47.0 kPa<br>AND<br>< 47.0 kPa | Two Stage Oil Pump is Present = FALSE<br><br>Diagnostic Status<br><br>Oil Pressure Sensor In Use<br><br>Quality or weighting factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Regions where diagnosis is possible have a quality or weighting factor value that is a function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability.<br>(<br>**P0521_RPM_Weighting_Factor - Single Stage Oil fump**<br><br>**P0521_Oil_Temp_Weighting_Factor - Single f>tage Oil Pump**<br><br>**P0521_Eng_Load_StabilityWeightingFactor - jingle Stage Oil Pump**<br><br>**P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump** | FALSE<br><br>Enabled<br><br>Yes<br><br>>= 0.30 weighting | Performed every 100 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ) with a first order filter coefficient of 0.01<br><br>(See Details on P0521 Supporting TablesTab)<br>**P0521_RPM_Weighting_Factor - Single Stage Oil Pump**<br>**P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump**<br>**P0521_Eng_Load_StabilityWeightingFactor - Single Stage Oil Pump**<br>**P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump**<br><br>No active DTC's | Fault bundles:<br>EngOilPressureSensorCktFA<br>CrankSensor_FA<br>ECT_Sensor_FA<br>MAF_SensorFA<br>IAT_SensorFA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Pressure (EOP) Sensor Circuit Low Voltage | P0522 | Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage. | (Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100 | < 5.00 percent<br><br>Deadband: < 5 percent or > 95 percent | Engine Speed Enable<br>Engine Speed Disable<br><br>Oil Pressure Sensor In Use<br><br>Diagnostic Status | > 400 rpm<br>< 350 rpm<br><br>Yes<br><br>Enabled | 1,280 failures out of 1,600 samples<br><br>Performed every 3.125 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Oil Pressure (EOP) Sensor Circuit High Voltage | P0523 | Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage. | (Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100 | > 95.00 percent<br><br>Deadband: < 5 percent or > 95 percent | Oil Pressure Sensor In Use<br><br>Diagnostic Status | Yes<br><br>Enabled | 1,280 failures out of 1,600 samples Performed every 3.125 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| System Voltage Low | P0562 | Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value. | System voltage low | Battery voltage <= 9.00 | System voltage low diag enable = TRUE<br><br>Run Crank voltage<br><br>Engine speed >= | 1.00<br><br>Voltage >5.00 volts<br><br>400.00 | 400 failures out of 500 samples<br><br>12.5 ms /sample | TypeC, 1 Trip No MIL Emissio ns Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| System Voltage High | P0563 | Detects a high 12V battery system. This diagnostic reports the DTC when battery voltage is high. | System voltage high | Battery voltage >= 18.00 | System voltage high diag enable = TRUE<br><br>Run Crank voltage | 1.00<br><br>Voltage >5.00 volts | 400 failures out of 500 samples<br><br>12.5 ms /sample | TypeC, 1 Trip No MIL Emissio ns Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Mutil-Functon Switch Circuit Legacy | P0564 | Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range.<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." | Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time. | The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges:<br><br>0.28 -0.31,<br>0.415-0.445,<br>0.585-0.615<br>0.78-0.81,<br>1.005- 1.035 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 0.50 seconds | TypeC, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control On Switch Circuit Legacy | P0565 | Detects a failure of the cruise on/off switch in a continously applied state<br><br>"Emissions Neutral Default Action - When the BCM tells the ECM that the cruise control analog input voltage is in the Momentary Cruise On/Off range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture. | Cruise Control On switch remains applied for greater than a calibratable period of time. | fail continuously in the applied state for greater than 20.00 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 20.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Resume Circuit Legacy | P0567 | Detects a failure of the cruise resume switch in a continously applied state<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Resume range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." | Cruise Control Resume switch remains applied for greater than a calibratable period of time. | fail continuously in the applied state for greater than 89.000 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 89.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Set Circuit Legacy | P0568 | Detects a failure of the cruise set switch in a continously applied state<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Set range for too long, the code is set and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." | Cruise Control Set switch remains applied for greater than a calibratable period of time. | fail continuously in the applied state for greater than 89.000 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 89.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Cancel Switch Circuit Legacy | P056C | Detects a failure of the cruise cancel switch in a continously applied state<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Cancel range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture. | Cruise Control Cancel switch remains applied for greater than a calibratable period of time. | fail continously in the applied state for greater than 20.00 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 20.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Brake Pedal Position Sensor Circuit Range/ Performance | P057B | This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure | Brake pedal position sensor movement diagnostic cal is enabled 1.00 | True | Diagnostic is enabled.<br><br>Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable | 1.00<br><br>ignition voltage > 10.00 | | MIL: Type A, 1 Trips |
| | | | Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B | EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80 | calculated brake pedal position delta sample counter > 50.00 for fast test<br><br>OR<br><br>calculated brake pedal position delta sample counter > 1,000.00 for slow test | calculated brake pedal position delta > 3.25<br><br>OR (for slow test)<br><br>shift lever has been in park once this key cycle<br><br>vehicle speed >= 5.00<br><br>accelerator pedal position < 5.00 | total number of EWMA tests > 20.00 | |
| | | | Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle | EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTest Pointweight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40 | no DTC's active (P057C, P057D) | shift lever has been in park once this key cycle<br><br>vehicle speed >= 5.00<br><br>accelerator pedal position < 5.00 | total number of EWMA tests > 2.00 | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Brake Pedal Position Sensor Circuit Low | P057C | detects short to ground for brake pedal position sensor | If x of y samples are observed below failure threshold, default brake pedal position to zero percent and set DTC. | 5.00 | Diagnostic is enabled.<br><br>Brake Pedal Position Sensor Low Voltage Diagnostic Enable | 1.00 | 20.00 / 32.00 counts | MIL: Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Brake Pedal Position Sensor Circuit High | P057D | detects open circuit for brake pedal position sensor | If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC | 95.00 | Diagnostic is enabled.<br><br>Brake Pedal Position Sensore High Voltage Diagnostic Enable | 1.00 | 20.00/<br><br>32.00 counts | MIL: Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Brake Pedal Position Sensor Circuit Intermittent/ Erratic | P057E | detects noisy / erratic ouput for brake pedal position sensor | If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC | 25.00 | Diagnostic is enabled.<br><br>Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable | 1.00 | 5.00/<br><br>20.00 counts | MIL: Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Multi-function Circuit Low Voltage Legacy | P0580 | detects short to ground failure for cruise control multi-function switch circuit (analog) voltage<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.<br><br>For certain vehicles (GM Global A), this also accounts for Open Circuit failure on cruise multi-function switch circuit. | Cruise Control analog circuit voltage must be in an "Short To Ground" range for greater than a calibratable period of time. | The cruise control analog voltage A/D count ratio is considered to be "open short to ground when the ratio is measured in the following rangs:<br><br>0-0.185 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 2.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Multi-function Circuit High Voltage Legacy | P0581 | detects short to power failure for cruise control multi-function switch circuit (analog) voltage<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture. | Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time. | The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range:<br><br>1.005- 1.035 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 2.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Multi-Function Input B Circuit Legacy | P0589 | Detect when cruise control multi-function switch circuit B (analog) voltage is in an invalid range.<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the cruise control analog input voltage is detected Out of Range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit. | Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time. | The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges:<br><br>0.28 -0.31,<br><br>0.415-0.445,<br><br>0.585-0.615,<br><br>0.78-0.81 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 0.50 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Multi-Function Input B Circuit Low Legacy | P0592 | detects short to ground failure for cruise control multi-function switch circuit B (analog) voltage.<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit is detected too lowfor too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit. | Cruise Control analog circuit B voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time. | The cruise control Circuit B analog voltage A/D count ratio is considered to be "open short to groun"d when the ratio is measured in the following rangs:<br><br>0-0.185 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 2.00 seconds | TypeC, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Multi-Function Input B Circuit High Legacy | P0593 | detects short to power failure for cruise control multi-function switch circuit B (analog) voltage.<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is detected too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit. | Cruise Control analog circuit B voltage must be in a "Short To Power" range for greater than a calibratable period of time. | The cruise control Circuit B analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range:<br><br>1.005- 1.035 | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 2.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Active Grill Air Shutter A Performance /Stuck OFF | P059F | A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position. | Smart Shutter Actuator 1 Position Response<br><br>AND<br><br>Shutter 1 Diagnostic Delay Threshold count | <> Smart Shutter Actuator 1 Commanded Position percent<br><br>AND<br><br>Counter > 109.00 counts | a. Ignition Run_Crank Active,<br>b. Ignition Run_Crank<br>AND<br>Ignition Accessory<br>AND<br>ECU Awake,<br>c. Command ShutterI Enable | a. = TRUE,<br><br>b. = FALSE<br>AND<br>= FALSE<br>AND<br>= TRUE,<br>c. = 1.00 | 1.00 failures out of 1.00 samples<br><br>1 sample / 100 milliseconds | Type B, 2 Trips |
| | | | Shutter 1 Performance Test count | = 5.00 counts | a. Ignition Run_Crank Active,<br>b. Ignition Run_Crank<br>AND<br>Ignition Accessory<br>AND<br>ECU Awake,<br>c. Command ShutterI Enable | a. = TRUE,<br><br>b. = FALSE<br>AND<br>= FALSE<br>AND<br>= TRUE,<br>c. = 1.00 | 1-5 actuator cycles<br><br>[1 cycle typically requires 10-25 seconds] | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Read Only Memory (ROM) | P0601 | This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code. | The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations. | 1 failure if the fault is detected during the first pass.<br>5.00<br>failures if the fault occurs after the first pass is complete. | | | Diagnostic runs continuously in the background. | Type A, 1 Trips |
| | | | The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations. | 254<br>failures detected via Error Correcting Code | | | Diagnostic runs continuously via the flash hardware. | |
| | | | | In all cases, the failure count is cleared when controller shuts down | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Not Programmed | P0602 | This DTC will be stored if the ECU is a service part that has not been programmed. | Service (reflash) controller calibration present | = 1 | | none | Diagnostic runs at powerup and once per second continuously after that | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECM Long Term Memory Reset | P0603 | This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down. | Static NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | Type A, 1 Trips |
| | | | Perserved NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | |
| | | | Perserved NVM region error detected during shut down. | | | | Diagnostic runs at controller power down. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECM RAM Failure | P0604 | Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously. | Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >= | 254 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | Type A, 1 Trips |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >= | 254 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >= | 5 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates > | 0.47247 s | | | When dual store updates occur. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are > | 65,534 counts | | | Diagnostic runs continuously (background loop) | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECM Processor Integrity Fault | P0606 | Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. | Time new seed not received exceeded | | | always running | 0.450 seconds | Type A, 1 Trips |
| | | | MAIN processor receives seed in wrong order | | | always running | 3 / 18 counts intermittent. 50 ms/count in the ECM main processor | |
| | | | 2 fails in a row in the MAIN processor's ALU check | | | Testis Enabled: 1 (If 0, this test is disabled) | 25 ms | |
| | | | 2 fails in a row in the MAIN processor's configuration register masks versus known good data | | | Testis Enabled: 1 (If 0, this test is disabled) | 12.5 to 25 ms | |
| | | | Checks number of stack over/under flow since last powerup reset >= | 3.00 | | Testis Enabled: 1 (If 0, this test is disabled) | variable, depends on length of time to corrupt stack | |
| | | | Voltage deviation > | 0.4950 | | Testis Enabled: 1 (If 0, this test is disabled) | 5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor | |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. | 3 (results in MIL), 5 (results in MIL and remedial action) | | Testis Enabled: 1 (If 0, this test is disabled) | variable, depends on length of time to access flash with corrupted memory | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Counter >= | | | | | |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL), 5 (results in MIL and remedial action) | | Testis Enabled: 1 (If 0, this test is disabled) | variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM | |
| | | | MAIN processor DMA transfer from Flash to RAM has 1 failure | | | Testis Enabled: 0 (If 0, this test is disabled) | variable, depends on length of time to write flash to RAM | |
| | | | Safety critical software is not executed in proper order. | >= 1 incorrect sequence. | | Testis Enabled: 1 (If 0, this test is disabled) | Fail Table, f(Loop Time). See supporting tables: **P0606.PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main orocessor | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | MAIN processor determines a seed has not changed within a specified time period within the 50ms task. | Previous seed value equals current seed value. | | Testis Enabled:<br>1<br>(If 0, this test is disabled) | Table, f(Loop Time). See supporting tables:<br>**P0606_Last Seed Timeout f (Loop Time)** | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECM Processor Integrity Performance | P0607 | Indicates that the ECM has detected an internal processor integrity performance. | Performs the failure diagnostic for the offline and online BIST results. | | | Testis enabled: 1 . (If 0, this test is disabled) | 5 counts background task/ count in the ECM main processor | Type A, 1 Trips |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL), 5 (results in MIL and remedial action) | | Testis enabled: 1 . (If 0, this test is disabled) | variable, depends on length of time to access flash with corrupted memory | |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL), 5 (results in MIL and remedial action) | | Testis enabled: 1 . (If 0, this test is disabled) | variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ANDRADC Fault | P060B | Indicates that the ECM has detected an ANDR ADC Fault. | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | Type A, 1 Trips |
| | | | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | Resistance deviation percent > | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | Resistance deviation | 6.00% | Run/Crank Voltage > | 7.00 V | 2 / 14 counts or | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | percent > | | | | 1.75 seconds continuous; 250 ms/count in the ECM main processor | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Main Processor Performance (Gasoline applications ONLY) | P060C | Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures<br><br>For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable. | Equivance Ratio torque compensation exceeds threshold | -101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | Type A, 1 Trips |
| | | | Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range | 46.37 mg | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range | 15.00 degrees | | Engine speed >0rpm | Up/down timer 429 ms continuous, 0.5 down time multipier | |
| | | | Torque Learn offset is out of bounds given by threshold range | High Threshold<br>0.00 Nm<br>Low Threshold<br>0.00 | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | Nm | | | | |
| | | | One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold | 80.00 mg | | Engine speed > 545 rpm | Up/down timer 460 ms continuous, 0.5 down time multipier | |
| | | | Difference between Unmanaged Spark and PACS Spark is greater than threshold | 15.00 degrees | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Commanded Predicted Engine Torque and its dual store do not match | N/A | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Zero pedal axle torque is out of bounds given by threshold range | High Threshold<br><br>1,396.00<br>Nm<br>Low Threshold<br><br>-65,535.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>175<br>ms continuous,<br>0.5<br>down time<br>multipier | |
| | | | Creep Coast Axle Torque is out of bounds given by threshold range | High Threshold<br><br>1,396.00<br>Nm<br>Low Threshold<br><br>-65,535.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>2,048<br>ms continuous,<br>0.5<br>down time<br>multipier | |
| | | | Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range | 101.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>175<br>ms continuous,<br>0.5<br>down time<br>multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range | High Threshold<br>1.000<br>Low Threshold<br>0.074 | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time multipier | |
| | | | Launch spark is active but the launch spark redundant path indicates it should not be active | N/A | | Engine speed <<br>7,900.00<br>or<br>8,000.00<br>rpm (hysteresis pair) | Up/down timer<br>160<br>ms continuous,<br>0.5<br>down time multipier | |
| | | | Rate limited vehicle speed and its dual store do not equal | N/A | | Time since first CAN message with vehicle speed >=<br>0.500<br>sec | 10/40<br>counts;<br>25.0msec/count | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Commanded engine torque due to fast actuators and its dual store do not equal | N/A | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Commanded engine torque due to slow actuators and its dual store do not equal | N/A | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | TOS to wheel speed conversion factor is out of bounds given by threshold range | High Threshold:<br><br>1.10 T/C Range Hi<br><br>0.10 T/C Range Lo<br><br>Low Threshold:<br><br>1.10 T/C Range Hi<br><br>0.10 T/C Range Lo | Ignition State | Accessory, run or crank | 255/6 counts; 25.0msec/count | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Cylinders active greater than commanded | 3 cylinders | | Engine run flag = TRUE > 2.00 s<br>Number of cylinder events since engine run > 24<br><br>No fuel injector faults active | Up/down timer 460 ms continuous, 0.5 down time multipier | |
| | | | Driver progression mode and its dual store do not equal | N/A | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Predicted torque for uncorrected zero pedal determination is greater than calculated limit. | Table, f(Engine, Oil Temp). **P060C_Speed Control External Load f(Oil Temp, RPM) +** 101.00 | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | Nm | | | | |
| | | | Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold | 100.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold | 100.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Positive Torque Offset is greater than its redundant calculation plus threshold<br><br>OR<br><br>Positive Torque Offset is less than its redundant calculation minus threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Commanded Predicted Engine Request is greater than its redundant calculation plus threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous,<br><br>down time multipier0.5 | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold | 4,096.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold | 4,096.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Regeneration Brake Assist is not within a specified range | Brake Regen Assist < 0 Nm or Brake Regen Assist > 1,000.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta | 15.00 degrees | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | 1. Cylinder Torque Offset exceeds step size threshold<br><br>OR<br><br>2. Sum of Cylinder Torque Offset exceeds sum threshold | 1. 101.00 Nm<br><br>2. 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Engine Capacity Minimum Engine Off is greater than threshold | 0 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold | 0 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Commanded Immediate Engine Request is greater than its redundant calculation plus threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation | N/A | | Engine speed greater than Orpm | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation | N/A | | Engine speed greater than Orpm | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | Idle speed control calculated predicted minimum torque request exceeds calculated torque limit | Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit | Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold | 1,396.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Driver Immediate Request is less than its redundant calculation minus threshold | 1,396.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Commanded Immediate Request is greater than its redundant calculation plus threshold<br><br>OR<br><br>Commanded Immediate Request is less than its redundant calculation minus threshold | 1,396.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Commanded Immediate Response Type is set to Inactive | N/A | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Difference between Cruise Axle Torque Arbitrated Reouest and | 50.00 Nm | | Cruise has been engaged for more than 4.00 | Up/down timer 2,048 ms continuous. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Cruise Axle Torque Request exceeds threshold | | | seconds | 0.5 down time multipier | |
| | | | Desired engine torque request greater than redundant calculation plus threshold | 100.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Engine min capacity above threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 69 ms continuous, 0.5 down time multipier | |
| | | | No fast unmanaged retarded spark above the applied spark plus the threshold | 15.00 Degree | | Engine speed greater than Orpm | Up/down timer 429 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Absolute difference of adjustment factor based on temperature and its dual store above threshold | 2.76 m/s | Ignition State | Accessory, run or crank | Up/down timer 97 ms continuous, 0.5 down time multipier | |
| | | | 1. Absolute difference of redundant calculated engine speed above threshold | 500 RPM | | Engine speed greater than 0 RPM | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | After throttle blade pressure and its dual store do not match | N/A | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Speed Control's Preditcted Torque Request and its dual store | N/A | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | do not match | | | | 0.5 down time multipier | |
| | | | Engine oil temperature and its dual store do not match | N/A | Ignition State | Accessory, run or crank | Up/down timer 233 ms continuous, 0.5 down time multipier | |
| | | | Desired throttle position greater than redundant calculation plus threshold | 8.06 percent | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold | 0.06 kpa | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Throttle desired torque above desired torque plus threshold | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Torquefeedback proportional term is out of allowable range or its dual store copy does not match | High Threshold<br>50.50 Nm<br>Low Threshold<br>-50.50 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match | High Threshold<br><br>94.69<br>Nm<br><br>Low Threshold<br><br>-101.00<br>Nm<br><br>Rate of change threshold<br><br>6.31<br>Nm/loop | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time<br>multipier | |
| | | | Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range | High Threshold<br><br>101.00<br>Nm<br><br>Low Threshold<br><br>-101.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time<br>multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range | High Threshold<br>1.06 %<br>Low Threshold<br>-1.06% | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range | High Threshold 0.0001639 Low Threshold -0.0001639 | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Difference of base friction torque and its redundant calculation is out of bounds given by threshold range | High Threshold<br>101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | Low Threshold<br><br>-101.00<br>Nm | | | | |
| | | | Accessory drive friction torque is out of bounds given by threshold range | High Threshold<br><br>101.00<br>Nm<br><br>Low Threshold<br><br>0.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time<br>multipier | |
| | | | AC friction torque is greater than commanded by AC control software or less than threshold limit | High Threshold<br><br>40.00<br>Nm<br><br>Low Threshold<br><br>0.00<br>Nm | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time<br>multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range | High Threshold<br>101.00 Nm<br>Low Threshold<br>-101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Generator friction torque is out of bounds given by threshold range | High Threshold<br>101.00 Nm<br>Low Threshold<br>0.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference between the Supercharger friction torque and its redundant | 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | calculation greater than threshold | | | | down time multipier | |
| | | | Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match | High Threshold<br><br>101.00 Nm<br><br>Low Threshold<br><br>-101.00 Nm<br><br>Rate of change threshold<br><br>6.31 Nm/loop | | Engine speed >0rpm MAF, MAP and Baro DTCs are false | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Torque error compensation is out of bounds given by threshold range | High Threshold<br><br>101.00 Nm<br><br>Low Threshold<br><br>0.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Delta Torque Baro compensation is out of bounds given by threshold range | High Threshold<br><br>15.39 Nm<br><br>Low Threshold<br><br>-25.41 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | 1. Difference of reserve torque value and its redundant calculation exceed threshold<br><br>OR<br><br>2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold<br><br>OR<br><br>3. Rate of change of reserve torque exceeds threshold, increasing direction only<br><br>OR<br><br>4. Reserve engine torque above allowable capacity threshold | 1.100.00 Nm<br><br>2. N/A<br><br>3.100.00 Nm<br><br>4.100.00 Nm | 3.&4.: Ignition State | 1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 101.00 Nm<br><br>3. &4.: Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Engine Vacuum and its dual store do not match | N/A | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time | Table, f(Desired Engine Torque). See supporting tables: | | Engine speed >0rpm | Up/down timer 160 ms continuous, 0.5 | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | event is greater than threshold | **P060C_Delta MAP Threshold f(Desired Engine Torque)** | | | down time multipier | |
| | | | Min. Axle Torque Capacity is greater than threshold | 0.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Driver Predicted Request is greater than its redundant calculation plus threshold<br><br>OR<br><br>Driver Predicted Request is less than its redundant calculation minus threshold | 1,396.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Cold Delta Friction Torque and its dual store do not match | N/A | Ignition State | Accessory, run or crank | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Predicted torque for zero pedal determination is greater than calculated limit. | Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM) +** 101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Commanded Predicted Axle Torque and its dual store do not match | 1 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Steady State Estimated Engine Torque and its dual store are not equal | N/A | | AFM not changing from Active to Inactive and preload torque not | Up/down timer 2,048 ms continuous, | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | changing and one loop after React command<br><br>Engine speed >0rpm | 0.5 down time multipier | |
| | | | Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold | 0.26 | | Engine run flag = TRUE > 10.00 s | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range | 15.00 degrees | Ignition State | Accessory, run or crank | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range | 15.00 degrees | | Engine speed >0rpm | Up/down timer 429 ms continuous, 0.5 down time multioier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Absolute difference between Estimated Engine Torque and its dual store are above a threshold | 101.00 Nm | | Engine speed >0rpm | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference between Estimated Engine Torquewithout reductions due to torque control and its dual store are above a threshold | 101.00 Nm | | Engine speed >0rpm | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range | 15.00 degrees | | Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 101.00 Nm | Up/down timer 460 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range | 101 Nm | | Engine speed >0rpm | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time | Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms | | Engine speed > 545 rpm | Up/down timer 460 ms continuous, 0.5 down time multipier | |
| | | | Rate limited cruise axle torque request and its dual store do not match within a threshold | 50.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 163 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | 1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range<br><br>OR<br><br>2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal<br><br>OR<br><br>3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal | 1.<br>3.50<br>%<br><br>2.<br>N/A<br><br>3.<br>N/A | Ignition State | Accessory, run or crank | Up/down timer<br>475<br>ms continuous,<br>0.5<br>down time multipier | |
| | | | **-Commanded axlotorquo—** | **-1,806.00----------** | -Ignition **State**..... | **-Aoooooory,runor orank----** | **-Up/down timer—** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | is greater than its redundant calculation by threshold | Nm | | | 475 ms continuous, 0.5 down time multipier | |
| | | | Commanded axle torque is less than its redundant calculation by threshold | 2,094.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Preload timerand its redundant calculation do not equal | N/A | Ignition State | Accessory, run or crank<br>AFM apps only | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | AC friction torque is greater than commanded by AC control software | 40.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation | N/A | | Engine speed >0rpm | Up/down timer 175 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold | 15.00 degrees | | Engine speed >0rpm | Up/down timer 160 ms continuous, 0.5 down time multipier | |
| | | | Transmission Torque Request cacluations do not equal their dual stores | N/A | | Run or Crank = TRUE > 0.50 s | 16/32 counts; 25.0msec/count | |
| | | | Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold | 0.01 Nm | | | Up/down timer 2,048 ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of maximum throttle area | 15 mm2 | | | Up/down timer 97 | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | and its redundant cacluation is greater than a threshold | | | | ms continuous, 0.5 down time multipier | |
| | | | Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold | 5.00 kPa | | | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Pedal learns and their redundant calculation do not equal | | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Throttle learns and their redundant calculation do not equal | | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Desired Throttle Position and its redundant calculation do not equal | | Ignition State | Accessory, run or crank | Up/down timer 475 ms continuous, 0.5 down time multipier | |
| | | | Calculated or Commanded Engine to Axle ratio is lower than a threshold<br>-OR-<br>Engine to Axle Offset is greater than a threshold | 0.9<br>101.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 175.00 ms continuous, 0.5 down time multipier | |
| | | | JDiffprpnc.p hptwppn | 52 35 Nm | J gnition Rtotp | _Accpc nry run nr crank | J Jp/rlnwn timer | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Cruise Arbritration Request and its redundant calcultion exceeds a threshold<br><br>-OR-<br><br>Difference between Cruise Accleration Request and its redundant calcultion exceeds a threshold | 0.05 KPH/Second | | | 500.00<br><br>ms continuous, 0.5 down time multipier | |
| | | | Delivered fraction does not match commanded fraction within a specified time limit | 0.0010 | Engine State | Running | Up/down timer 200.00 ms continuous, 0.5 down time multipier | |
| | | | Difference between delivered cylinder deactivation does not match commanded cylinder deactivation is greater than a threshold | 64.00 | Engine State | Running | Up/down timer 200.00 ms continuous, 0.5 down time multipier | |
| | | | Difference between commanded Axle Torque and its redundant calcultion is greater than a threshold<br><br>-OR-<br><br>Difference between commanded Axle Torque and its redundant calcultion is less than a threshold | 1,396.00 Nm<br><br>2,094.00 Nm | Ignition State | Accessory, run or crank | Up/down timer 2,047.97 ms continuous, 0.5 down time multipier | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Control Circuit Open (12VSS) | P0615 | Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground. | Starter control diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>= 11.00 volts | 40 failures out of 50 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Control Circuit Low Voltage (12VSS) | P0616 | Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 0.5 Ohms impedance between signal and controller ground | Starter control diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>=6.41 volts | 8 failures out of 10 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Control Circuit High Voltage (12VSS) | P0617 | Controller specific output driver circuit diagnoses the Starter relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 0.5 Ohms impedance between signal and controller power | Starter control diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>=6.41 volts | 40 failures out of 50 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Generator 1 F-Terminal Circuit | P0622 | This DTC checks the alternator F-Terminal circuit for electrical integrity during operation. | Generator field winding duty cycle | >= 65.00 [Pct] | Test enabled by calibration;<br>and<br>(Generator present<br>and<br>Generator 1 F-Terminal Circuit test fault in engine running<br>)<br>Run Crank voltage<br>and<br>No Active DTCs<br>and<br>Engine Running<br>and<br>Engine Crank movement detected<br>and<br>(Starter engaged<br>OR<br>Run Crank voltage above 11.00 ) for a time ) | 1.00 [Boolean]<br>==1.00 [Boolean]<br>== FALSE<br>>=11.00 [V]<br>CrankSensor_FA<br>CamSensorAnyLocationFA<br>== FALSE<br>== FALSE<br>== FALSE<br>1.00 | 5.00 [s] (Debouncing performed based on cumulative time in faulty condition)<br>Task rate = 50 ms | Type A, 1 Trips |
| | | | Generator field winding duty cycle | <= 5.00 [Pct] | Test enabled by calibration; | 1.00 [Boolean] | 5.00 [s] (Debouncing performed based on cumulative | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | and<br>(Generator present<br><br>and<br>Generator 1 F-Terminal Circuit test fault in key on<br>)<br><br>and<br>Engine speed<br><br>and<br>L-Terminal_FA<br><br>and<br>Generator 1 F-Terminal present<br><br>and<br>Generator PWM command<br><br>and<br>No Active DTCs<br><br>and<br>Engine Running<br><br>and<br>Generator control disabled<br><br>and<br>Generator Service Device Control Command Request | ==1.00 [Boolean]<br><br>== FALSE<br><br>< 1,000.00 [rpm]<br><br>== FALSE<br><br>== 1.00 [Boolean]<br><br>> 42.00 [Pct]<br><br>CrankSensor_FA<br>CamSensorAnyLocationFA<br><br>== TRUE<br><br>== FALSE<br><br>== FALSE | time in faulty condition)<br><br>Task rate = 50 ms | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Relay Control Circuit Open | P0627 | Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground. | Run/Crank Voltage | Voltage 11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type A, 1 Trips<br><br>Note: In certain controlle rs P0629 may also set (Fuel Pump Relay Control Short to Power) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Relay Control Circuit Low Voltage | P0628 | Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 0.5 Ohms impedance between signal and controller ground | Run/Crank Voltage | Voltage 11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Relay Control Circuit High Voltage | P0629 | Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 0.5 Ohms impedance between signal and controller power | Run/Crank Voltage | Voltage 11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type A, 1 Trips<br><br>Note: In certain controlle rs P0627 may also set (Fuel Pump Relay Control Open Circuit) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Fuel Injector Control Performance | P062B | This DTC determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit) | Internal ECU Boost Voltage<br><br>OR<br><br>Internal ECU Boost Voltage<br><br>OR<br><br>Driver Status<br><br>OR<br><br>Driver Status | >= 90 Volts<br><br><br><br><br><= 40 Volts<br><br><br><br><br>= Not Ready<br><br><br><br><br>= Uninitialized | Battery Voltage | >= 8or>= 11<br><br>Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range | High Voltage - 160 failures out of 200 samples<br><br>Low Voltage - 160 failures out of 200 samples<br><br>Driver Status Not Ready- 160 failures out of 200 samples<br><br>Driver Status Uninitialized - Uninitialized state for >= 100 counts<br><br>All at 12.5ms per sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Powertrain Internal Control Module EEPROM Error | P062F | This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed. | HWIO reports that writing to NVM (at shutdown) will not succeed | | | | Diagnostic runs at controller power up. | Type B, 2 Trips |
| | | | HWIO reports the assembly calibration integrity check has failed | | | | Diagnostic runs at controller power up. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| VIN Not Programmed or Mismatched - Engine Control Module (ECM) | P0630 | This DTC checks that the VIN is correctly written | At least one of the programmed VIN digits | Is not a valid ASCII character | OBD Manufacturer Enable Counter | = 0 | 250 ms / test Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 5 Volt Reference #1 Circuit | P0641 | Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough. | ECM percent Vrefl <<br><br>or ECM percent Vrefl ><br><br>or the difference between ECM filtered percent Vrefl and percent Vrefl ><br><br>(100% corresponds to 5.5 Volt) | 88.64 % Vrefl<br><br>93.18% Vrefl<br><br>0.90 % Vrefl | Diagnostic enabled<br><br>AND<br>[<br><br>(Run/Crank voltage for Time period AND Starter engaged)<br><br>OR<br><br>(Run/Crank voltage AND Starter engaged)<br>] | = 1<br><br>>6.41 Volts<br>= 25.00 Seconds<br>= FALSE<br><br>>8.41 Volts<br>= TRUE | 19/39 counts; or<br><br>187.5000 ms continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module 02 Sensor Processor Performance Bank 1) (For use with WRAF | P064D | Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC.<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters. | B1S1 WRAF ASIC indicates control module faults | Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status | Diagnostic is Enabled<br><br>Engine Run or Auto stop<br><br>Heater Warm-up delay<br><br>WRAF circuit diagnostic delay since power up | <br><br>= True<br><br>= Complete<br><br>> 20.0 sec | 128 controller status fail counts out of 160 samples<br><br>OR<br><br>128 measure valid fail counts out of 160 samples<br><br>25 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module 02 Sensor Processor Performance Bank 2) (For use with WRAF | P064E | Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC.<br><br>The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters. | B2S1 WRAF ASIC indicates control module faults | Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status | Diagnostic is Enabled<br><br>Engine Run or Auto stop<br><br>Heater Warm-up delay<br><br>WRAF circuit diagnostic delay since power up | <br><br>= True<br><br>= Complete<br><br>> 20.0 sec | 128 controller status fail counts out of 160 samples<br><br>OR<br><br>128 measure valid fail counts out of 160 samples<br><br>25 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 5 Volt Reference #2 Circuit | P0651 | Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough. | ECM percent Vref2 <<br><br>or ECM percent Vref2 ><br><br>or the difference between ECM filtered percent Vref2 and percent Vref2 ><br><br>(100% corresponds to 5.5 Volt) | 88.64 % Vref2<br><br>93.18% Vref2<br><br>0.90 % Vref2 | Diagnostic enabled<br><br>AND<br>[<br>(Run/Crank voltage for Time period AND Starter engaged)<br><br>OR<br><br>(Run/Crank voltage AND Starter engaged)<br>] | = 1<br><br>>6.41 Volts<br>= 25.00 Seconds<br>= FALSE<br><br>>8.41 Volts<br>= TRUE | 19/39 counts; or<br><br>187.5000 ms continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Relay Control Circuit | P0685 | Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 K 0 ohms impedance between output and controller ground | Powertrain relay Open circuit diagnostic diagnostic enable = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage >11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground). |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Relay Control Circuit Low Voltage | P0686 | Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to ground: < 0.5 Q impedance between output and controller ground | Powertrain relay Low Side driver short to ground diagnostic diagnostic enable = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage >11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controlle rs P0685 may also set (Powertr ain Relay Control Open Circuit). |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Relay Control Circuit High Voltage | P0687 | Detects a short to power in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to power failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to power:<br>< 0.5 Q impedance between output and controller power | Powertrain relay Low Side driver short to power diagnostic enable = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage >11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Relay Feedback Circuit Low Voltage | P0689 | Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value. | Control module relay feedback circuit low voltage | Powertrain relay voltage <=5.00 | Powertrain relay short low diagnostic enable<br><br>Run Crank voltage<br><br>Powertrain relay state | = 1.00<br><br>>9.00<br><br>= ON | 5 failures out of 6 samples<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Relay Feedback Circuit High Voltage | P0690 | Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off' for a calibrated duration. | Powertrain Relay Voltage | >= 4.00 volts will increment the fail counter | Powertrain relay high voltage feedback circuit diagnostic enable = TRUE<br><br>Powertrain relay commanded “OFF”<br><br>No active DTCs: | 1.00<br><br>>=2.00 seconds<br><br>PowertrainRelayStateOn_FA | 50 failures out of 63 samples<br><br>100ms /Sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 5 Volt Reference #3 Circuit | P0697 | Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough. | ECM percent Vref3 <<br><br>or ECM percent Vref3 ><br><br>or the difference between ECM filtered percent Vref3 and percent Vref3 ><br><br>(100% corresponds to 5.5 Volt) | 88.64 % Vref3<br><br>93.18% Vref3<br><br>0.90 % Vref3 | Diagnostic enabled<br><br>AND<br>[<br>(Run/Crank voltage for Time period AND Starter engaged)<br><br>OR<br><br>(Run/Crank voltage AND Starter engaged)<br>] | = 1<br><br>>6.41 Volts<br>= 25.00 Seconds<br>= FALSE<br><br>>8.41 Volts<br>= TRUE | 19/39 counts; or<br><br>187.5000 ms continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 5 Volt Reference #4 Circuit | P06A3 | Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough. | ECM percent Vref4 <<br><br>or ECM percent Vref4 ><br><br>or the difference between ECM filtered percent Vref4 and percent Vref4 ><br><br>(100% corresponds to 5.5 Volt) | 88.64 % Vref4<br><br>93.18% Vref4<br><br>0.90 % Vref4 | Diagnostic enabled<br><br>AND<br>[<br>(Run/Crank voltage for Time period AND Starter engaged)<br><br>OR<br><br>(Run/Crank voltage AND Starter engaged)<br>] | = 1<br><br>>6.41 Volts<br>= 25.00 Seconds<br>= FALSE<br><br>>8.41 Volts<br>= TRUE | 19/39 counts; or<br><br>187.5000 ms continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Torque Managment System - Forced Engine Shutdown | P06AF | This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring ECM. When the ECM does not receive a correct pattern or a missing pattern to the monitoring ECM, the DTC is set. | Received pattern from the TCM<br>OR<br>Received malfunction pattern | # expected pattern<br>>= 2 counts | Run Crank Active Time | Run or Crank<br>>= 0.63 seconds | 6/12 counts or 2.00 seconds continuous; 25 ms/count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Knock Sensor Processor 1 Performance | P06B6 | This diagnostic checks for a fault with the internal test circuit (sensor #1) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds. | FFT Diagnostic Output | **> P06B6_P06B7_OpenTestCktThrshMin**<br><br>**AND**<br><br>**< P06B6_P06B7_OpenTestCktThrshMax**<br><br>**See Supporting Tables** | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)<br><br>Engine Air Flow | Yes<br><br>> 2.0 seconds<br><br>> 400 RPM and < 4,000 RPM<br><br>> 200 Revs<br><br>> 10 mg/cylinder and < 2,000 mg/cylinder | First Order Lag Filter with Weight Coefficient<br><br>Weight Coefficient = 0.0099<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Knock Sensor Processor 2 Performance | P06B7 | This diagnostic checks for a fault with the internal test circuit (sensor #2) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds. | Individual Sensor Threshold Enabled?<br><br>FFT Diagnostic Output | 0.00 , Use Case 1<br><br>**Case 1:**<br><br>**> P06B6_P06B7_OpenTestCktThrshMin**<br><br>**AND**<br><br>< **P06B6_P06B7_OpenTestCktThrshMax**<br><br>**See Supporting Tables**<br><br>**Case 2:**<br><br>> **P06B7_OpenTestCktMin2**<br><br>**AND**<br><br>< **P06B7_OpenTestCktMax2**<br><br>**See Supporting Tables** | Diagnostic Enabled?<br><br>Engine Run Time<br><br>Engine Speed<br><br>Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)<br><br>Engine Air Flow | Yes<br><br>> 2.0 seconds<br><br>> 400 RPM<br>and<br>< 4,000 RPM<br><br>> 200 Revs<br><br>> 10 mg/cylinder<br>and<br>< 2,000 mg/cylinder | First Order Lag Filter with Weight Coefficient<br><br>**Case 1 Weight Coefficient =**<br><br>0.0099<br><br>Updated each engine event<br><br>**Case 2 Weight Coefficient =** 0.0100<br><br>Updated each engine event | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable to Engage Neutral | P073D | Detects the inability to achieve or remain in Neutral. | Actual Arbitrated Transmission Range | ≠Neutral | Actual Transmission Range<br><br>Commanded Transmission Range<br><br>AND<br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when<br>RunCrankActive<br>until ActualRange<br>AND<br>Accessory/Wakeup | = Good value<br><br>= Neutral<br><br>=False<br><br>=False<br><br>=True<br><br>= True<br><br>=True<br>=Park<br><br>=False | 10,000.00 msec from Park<br><br>10,000.00 msec from Reverse<br><br>10,000.00 msec from Drive | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable to Engage Reverse | P073E | Detects the failure to achieve the expected command to Reverse range. | Actual Arbitrated Transmission Range | ≠Reverse | Actual Transmission Range<br><br>Commanded Transmission Range<br><br>AND<br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when<br>RunCrankActive<br>until ActualRange<br>AND<br>Accessory/Wakeup | = Good value<br><br>= Reverse<br><br>=False<br><br>=False<br><br>=True<br><br>=True<br><br>=True<br>=Park<br><br>=False | 10,000.00 msec from Park<br><br>3,600,000.00 msec from Neutral*<br><br>3,600,000.00 msec from Drive*<br><br>internal does not diagnose from N&D | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch A Circuit Low | P07B3 | The Park Button Circuit Diagnostic detects a reading Low | Park Position Measured Voltage | < Low 446 counts<br><br>446 counts = 43.6% of 5 Volts<br><br>1023 counts = 5 Volts | | | 16 Failures out of 20 Samples (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch A Circuit High | P07B4 | The Park Button Circuit Diagnostic detects a reading High | Park Position Measured Voltage | > High 853 counts<br>853 counts = 83.3% of 5 Volts.<br>1023 Counts = 5 V | | | 16 Failures out of 20 Samples (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch A Circuit Performance | P07B5 | The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones. | Park Position Measured Voltage | (544<X<753 counts)<br><br>53.2% < X < 73.7% of 5 Volts.<br>1023 Counts = 5 V | DTC not set | P07B3 OR<br>P07B4 | 2000 Failures out of 2500 Samples<br>=10 sec (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch B Circuit Low | P07B9 | The Park Button Circuit Diagnostic detects a reading Low | Park Position Measured Voltage | < Low 446 counts<br>446 counts = 43.6% of 5 Volts.<br><br>1023 Counts = 5 V | Diagnostic Enable Calibration | =TRUE | 16 Failures out of 20 Samples (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch B Circuit High | P07BA | The Park Button Circuit Diagnostic detects a reading High | Park Position Measured Voltage | > High 853 counts<br>853 counts = 83.3% of 5 Volts.<br>1023 Counts = 5 V | Diagnostic Enable Calibration | =TRUE | 16 Failures out of 20 Samples (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Sensor/ Switch B Circuit Performance | P07BB | The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones. | Park Position Measured Voltage | (544<X<753 counts)<br><br>53.2% < X < 73.7% of 5 Volts.<br>1023 Counts = 5 V | Diagnostic Enable Calibration<br><br>DTC not set | =TRUE<br><br>P07BA or P07B9 | 2000 Failures out of 2500 Samples<br>=10 sec (SIB is 5 msec loop) | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Switch A/B Correlation | P07BE | Correlation diagnosic compares the two switches behind the Park pushbutton | Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states.<br><br>Park 1 and Park 2 are both: | =Valid, but not equal continuously<br><br>= valid states (RELEASED or PRESSED), but disagree. | Not Fault Active<br><br>Diagnostic System Disable Calibration:<br><br>Park Comparison Diagnostics Enable Calibration:<br><br>Vehicle speed: | P07B3, P07B4, P07B5, P07B9, P07BA, P07BB<br><br>=FALSE<br><br>= TRUE<br><br><= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50. | 4,800 failures out of 6,000 samples<br><br>12.5 ms rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable to Engage Park | P07E4 | Detects the inability to achieve or remain in Park. | Actual Arbitrated Transmission Range | #Park | Actual Transmission Range<br><br>Commanded Transmission Range<br><br>AND<br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when<br>RunCrankActive<br>until ActualRange<br>AND<br>Accessory/Wakeup | = Good value<br><br>= Park<br><br>=False<br><br>=False<br><br>=True<br><br>= True<br><br>=True<br>=Park<br><br>=False | 10,000.00 msec from Reverse<br><br>10,000.00 msec from Neutral<br><br>10,000.00 msec from Drive | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable to Engage Drive | P07E5 | Detects the failure to achieve the expected command to Drive range. | Actual Arbitrated Transmission Range | #Drive | Actual Transmission Range<br><br>Commanded Transmission Range<br><br>AND<br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when<br>RunCrankActive<br>until ActualRange<br>AND<br>Accessory/Wakeup | = Good value<br><br>= Drive<br><br>=False<br><br>=False<br><br>=True<br><br>= True<br><br>=True<br>=Park<br><br>=False | 10,000.00 msec from Park<br><br>10,000.00 msec from Reverse<br><br>10,000.00 msec from Neutral | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 1 Circuit Range/ Performance | P082A | Detects Gear Lever X Position Sensor 1 circuit is reading outside expected values | Gear Lever Position Sensor 1 Measured Duty Cycle on X<br><br>OR<br><br>Gear Lever Position Sensor 1 Frequency error detection flag on X<br><br>OR<br><br>Gear Lever Position Sensor 1 Measured Duty Cycle on X and Gear Lever Position Sensor 2 Measured Duty Cycle on X differ by more than | Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path<br><br>= True<br><br>>12.00% | Not Fault Active<br><br>Controller has been awake for at least | P082B, P082C<br><br>0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 1 Circuit Low | P082B | Detects Gear Lever X Position Sensor 1 circuit reading low | Gear Lever Position Sensor 1 Measured Duty Cycle on X | < 5.00 % | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 1 Circuit High | P082C | Detects Gear Lever X Position Sensor 1 circuit reading high | Gear Lever Position Sensor 1 Measured Duty Cycle on X | > 95.00% | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 1 Circuit Performance | P082D | Detects Gear Lever Y Position Sensor 1 circuit is reading outside expected values | Gear Lever Position Sensor 1 Measured Duty Cycle on Y<br><br>OR<br><br>Gear Lever Position Sensor 1 Frequency error detection flag on Y | Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path<br><br>= True | Not Fault Active<br><br>Controller has been awake for at least | P082E, P082F<br><br>0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 1 Circuit Low | P082E | Detects Gear Lever Y Position Sensor 1 circuit reading low | Gear Lever Position Sensor 1 Measured Duty Cycle on Y | < 5.00 % | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 1 Circuit High | P082F | Detects Gear Lever Y Position Sensor 1 circuit reading high | Gear Lever Position Sensor 1 Measured Duty Cycle on Y | > 95.00 % | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 2 Circuit Performance | P089B | Detects Gear Lever X Position Sensor 2 circuit is reading outside expected values | Gear Lever Position Sensor 2 Measured Duty Cycle on X<br><br>OR<br><br>Gear Lever Position Sensor 2 Frequency error detection flag on X<br><br>OR<br><br>Gear Lever Position Sensor 2 Measured Duty Cycle on X and Gear Lever Position Sensor 1 Measured Duty Cycle on X differ by more than | Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path<br><br>= True<br><br>>12.00% | Not Fault Active<br><br>Controller has been awake for at least | P089C, P089D<br><br>0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 2 Circuit Low | P089C | Detects Gear Lever X Position Sensor 2 circuit reading low | Gear Lever Position Sensor 2 Measured Duty Cycle on X | < 5.00% | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever X Position Sensor 2 Circuit High | P089D | Detects Gear Lever X Position Sensor 2 circuit reading high | Gear Lever Position Sensor 2 Measured Duty Cycle on X | > 95.00 % | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 2 Circuit Performance | P08A0 | Detects Gear Lever Y Position Sensor 2 circuit is reading outside expected values | Gear Lever Position Sensor 2 Measured Duty Cycle on Y<br><br>OR<br><br>Gear Lever Position Sensor 2 Frequency error detection flag on Y<br><br>OR<br><br>Gear Lever Position Sensor 1 Measured Duty Cycle on Y and Gear Lever Position Sensor 2 Measured Duty Cycle on Y differ by more than | Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path<br><br>= True<br><br>> 12.00% | Not Fault Active<br><br>Controller has been awake for at least | P08A1, P08A2<br><br>0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 2 Circuit Low | P08A1 | Detects Gear Lever Y Position Sensor 2 circuit reading low | Gear Lever Position Sensor 2 Measured Duty Cycle on Y | < 5.00% | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Gear Lever Y Position Sensor 2 Circuit High | P08A2 | Detects Gear Lever Y Position Sensor 2 circuit reading high | Gear Lever Position Sensor 2 Measured Duty Cycle on Y | > 95.00% | Controller has been awake for at least | 0.05 seconds | 10.00 failures out of 12.00 samples<br><br>25 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage SensorA Range/ Performance | P0E32 | Detects DC/DC Converter Actuator Voltage 1 Performance issues | Bypass Mode:<br>Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank | > 2 Volt | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br>Engine running<br>OR<br>Engine stopped<br>Battery Voltage | 1<br>1<br>TRUE<br>TRUE<br>FALSE<br>for > 160 loops in 12.50 ms loop<br>for > 160 loops in 12.50 ms loop<br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |
| | | | Stabilize Mode- Auto-Cranking:<br>Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank | > 2 Volt | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br>Engine auto-cranking<br>Battery Voltage | 1<br>1<br>TRUE<br>TRUE<br>FALSE<br>for > 0 loops in 12.50ms loop<br>>= 6.60 Volts | 8 failed samples out of 16 samples in 12.50 ms loop | |
| | | | Stablize Mode-Auto-Cranking Events:<br>Number of failed auto-cranking events exceeds threshold | > 2 failed auto-cranking events | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory) | 1<br>1<br>TRUE | 2 failed auto-crank events out of 3 consecutive auto-crank events | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Engine auto-cranking | TRUE<br><br>FALSE<br><br><br>has occurred | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage SensorA Low | P0E33 | Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for<br>short to ground faults. | DC/DC Converter Actuator Voltage Raw Value 1 | < 1 Volt | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage SensorA High | P0E34 | Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for<br>short to battery faults. | DC/DC Converter Actuator Voltage Raw Value 1 | > 28 Volt | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage Sensor B Range/ Performance | P0E37 | Detects DC/DC Converter Actuator Voltage 2 Performance issues | Bypass Mode:<br>Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank | > 2 Volt | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br>Engine running<br>OR<br>Engine stopped<br>Battery Voltage | 1<br>1<br>TRUE<br>TRUE<br>FALSE<br>for > 160 loops in 12.50 ms loop<br>for > 160 loops in 12.50 ms loop<br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |
| | | | Stabilize Mode- Auto-Cranking:<br>Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank | > 2 Volt | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br>Engine auto-cranking<br>Battery Voltage | 1<br>1<br>TRUE<br>TRUE<br>FALSE<br>for> 0 loops in 12.50 ms loop<br>>= 6.60 Volts | 8 failed samples out of 16 samples in 12.50 ms loop | |
| | | | Stablize Mode-Auto-Cranking Events:<br>Number of failed auto-cranking events exceeds threshold | > 2 failed auto-cranking events | Diagnostic enabled<br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory) | 1<br>1<br>TRUE | 2 failed auto-crank events out of 3 consecutive auto-crank events | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Engine auto-cranking | TRUE<br><br>FALSE<br><br>has occurred | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage Sensor B Low | P0E38 | Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for<br>short to ground faults. | DC/DC Converter Actuator Voltage Raw Value 2 | < 1 Volt | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Voltage Sensor B High | P0E39 | Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for<br>short to battery faults. | DC/DC Converter Actuator Voltage Raw Value 2 | > 28 Volt | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Reset Error | P1005 | This diagnostic is intended to monitor a message from the Fuel Pump Driver Control Module/Fuel TankZone Module and use the information in the message to diagnose if the module is resetting unexpectedly. The message contains the time since the last reset as measured by the module. If the time since the last reset decreases from one message to another without indicating that a timer rollover occurred, a reset of the external module will be indicated. If too many resets occur in a sample window the diagnostic will fail. | If the diagnostic has detected that an unexpected reset has occured:<br><br>The time since last module reset event data value received from the FPDCM/FTZM is less than the previous value and also<br><br>And<br><br>The rollover occurred value received from the FPDCM/FTZM is false<br><br>for<br><br>out of total samples | <br><br><br><br><br><br><br><br><=0.50 seconds<br><br><br><br><br><br><br>>=2.00 counts<br><br>>=400.00 counts | DTC is enabled<br><br>Sensor bus relay is on<br><br>Battery voltage<br><br>No FTZM reconfiguration is requested for<br><br>A new message that contains the FPDCM/ FTZM reset data is received<br><br>The following DTCs that diagnose the message that contains the FPDCM/ FTZM reset data are not active:<br><br>P1000<br><br>U18A2 | Enabled<br><br><br><br>> 11.00 Volts<br><br>1.00 second(s) | This diagnostic samples every 100.00 milliseconds. | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Phase U-V-W Circuit Open | P1029 | This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"]<br><br>The diagnostic can detect open circuit faults when the fuel pump is not rotating. In the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. This process is completed in less than 1 millisecond. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are | Phased-pair circuit voltage | 3V <= V [back-EMF] <=6V | a) Sensed fuel pump speed<br><br>b) Device configuration Chassis Fuel Pres System type<br><br>c) Diagnostic is ..<br><br>d) CAN Sensor Bus message $3EC Available<br><br>e) Sensor Bus Relay On<br><br>f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [Info7] | a) == 0 RPM<br><br>b) == Brushless motor<br><br>c) ENABLED<br><br>d) == TRUE<br><br>e) == TRUE<br><br>f) == False | 40.00 failures / 80.00 samples<br><br>1 sample / 12.5 ms | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds.<br>This open circuit diagnostic follows "smart device" Component Technical Specifications. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Phase U-V-W Circuit Low | P102A | This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground]<br><br>The diagnostic detects short-to-ground faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair high-side drive is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage].<br>The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3- | Phased-pair circuit voltage Difference | Vdelta > 0.145 V | a) Chassis Fuel Pres System type Device configuration<br><br>b) Diagnostic is ..<br><br>c) CAN Sensor Bus message $3EC_Avail<br><br>d) Sensor Bus Relay On<br><br>e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7] | a) == Brushless motor<br><br>b) Enabled<br><br>c) == TRUE<br><br>d) == TRUE<br><br>e) == False | 40.00 failures / 80.00 samples<br><br>1 sample / 12.5 ms | Type A, 1 Trips |
| | | | Phased-pair circuit voltage | V [back-EMF] >= 6 V | a) Sensed fuel pump speed<br><br>b) Chassis Fuel Pres System type Device configuration<br><br>c) Diagnostic is ..<br><br>d) CAN Sensor Bus message $3EC Available<br><br>e) Sensor Bus Relay On<br><br>f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7] | a) == 0 RPM<br><br>b) == Brushless motor<br><br>c) Enabled<br><br>d) == TRUE<br><br>e) == TRUE<br><br>f) == False | 40.00 failures / 80.00 samples<br><br>1 sample / 12.5 ms | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds.<br>This open circuit diagnostic follows "smart device" Component Technical Specifications. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Phase U-V-W Circuit High | P102B | This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery]<br><br>The diagnostic detects short-to-battery faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair low-side current shunt is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage].<br>The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the | Phased-pair circuit voltage Difference | Vdelta > 0.4 V | a) Diagnostic is ..<br><br>b) Device configuration Chassis Fuel Pressure SysType == FTZM Electronically Commutated<br><br>c) CAN Sensor Bus message $3EC_Avail<br><br>d) Sensor Bus Relay On<br><br>e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect | a) Enabled<br><br>b) == TRUE<br><br>c) == TRUE<br><br>d) == TRUE<br><br>e) == False | 40.00 failures/ 80.00 samples<br><br>1 sample / 12.5 ms | Type A, 1 Trips |
| | | | Phased-pair circuit voltage | V[backEMF] > 6 V | a) Diagnostic is ..<br><br>b) Sensed fuel pump speed<br><br>b) Device configuration Fuel Pressure System Type == FTZM Electronically Commutated<br><br>c) CAN Sensor Bus message $3EC_Avail<br><br>d) Sensor Bus Relay On<br><br>e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect | a) Enabled<br><br>b) == o RPM<br><br>b) == TRUE<br><br>c) == TRUE<br><br>d) == TRUE<br><br>e) == False | 40.00 failures/ 80.00 samples<br><br>1 sample / 12.5 ms | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds.<br>This open circuit diagnostic follows "smart device" Component Technical Specifications. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Heater Supply Voltage Sense Circuit Range/ Performance | P103B | The P103B diagnostic determines if the heater supply circuit is rational by comparing the heater supply voltage to the run crank voltage and calculating the difference.<br><br>The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage.<br><br>The diagnostic failure counter is incremented if the voltage difference is greater than the threshold. This DTC is set based on the fail and sample counters. | The absolute value of Heater Supply Voltage delta from Run Crank voltage | > 2.00 volts | Diagnostic is Enabled<br><br>Powertrain relay in range (Relay in range is defined as relay voltage<br><br>Run Crank signal active | = True<br><br>> 11.00 volts)<br><br>= True<br>(Please see **"Run/Crank Active conditions"** in Supporting Tables) | 8 failures out of 10 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Heater Supply Voltage Sense Circuit Low | P103C | The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold.<br><br>The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage.<br><br>The diagnostic failure counter is incremented if the heater supply voltage is less than the threshold. This DTC is set based on the fail and sample counters. | Heater Supply Voltage | < 8.00 volts | Diagnostic is Enabled<br><br>Powertrain relay in range (Relay in range is defined as relay voltage<br><br>Run Crank signal active | = True<br><br>> 11.00 volts)<br><br>= True<br>(Please see **"Run/Crank Active conditions"** in Supporting Tables) | 8 failures out of 10 samples<br><br>250 ms /sample<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Injection Pulse Performance | P10A3 | Diagnostic to determine if injection pulse total compensation for cylinder 1 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Injection Pulse Performance | P10A4 | Diagnostic to determine if injection pulse total compensation for cylinder 1 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Injection Pulse Performance | P10A5 | Diagnostic to determine if injection pulse total compensation for cylinder 2 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Injection Pulse Performance | P10A6 | Diagnostic to determine if injection pulse total compensation for cylinder 2 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Injection Pulse Performance | P10A7 | Diagnostic to determine if injection pulse total compensation for cylinder 3 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Injection Pulse Performance | P10A8 | Diagnostic to determine if injection pulse total compensation for cylinder 3 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Injection Pulse Performance | P10A9 | Diagnostic to determine if injection pulse total compensation for cylinder 4 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Injection Pulse Performance | P10AA | Diagnostic to determine if injection pulse total compensation for cylinder 4 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Injection Pulse Performance | P10AB | Diagnostic to determine if injection pulse total compensation for cylinder 5 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Injection Pulse Performance | P10AC | Diagnostic to determine if injection pulse total compensation for cylinder 5 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Injection Pulse Performance | P10AD | Diagnostic to determine if injection pulse total compensation for cylinder 6 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Injection Pulse Performance | P10AE | Diagnostic to determine if injection pulse total compensation for cylinder 6 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Injection Pulse Performance | P10AF | Diagnostic to determine if injection pulse total compensation for cylinder 7 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Injection Pulse Performance | P10B0 | Diagnostic to determine if injection pulse total compensation for cylinder 7 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Injection Pulse Performance | P10B1 | Diagnostic to determine if injection pulse total compensation for cylinder 8 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | < **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Injection Pulse Performance | P10B2 | Diagnostic to determine if injection pulse total compensation for cylinder 8 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires. | Total Injection Small Pulse compensation | > **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>FULR_b_FPV_MeasDiag_TFTKO<br><br>Uncompensated Injection Pulse Width (Injection is commanded) | = True<br><br>= True<br><br>> 0 | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure Sensor AZ C Correlation | P10BC | Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range.<br><br>With this monitor, the BARO sensor is compared to a redundant sensor called BARO C. If the BARO sensor value is not similar to the BARO C sensor value, then the BARO Sensor A/C Correlation diagnostic will fail. | Difference between BARO A Sensor reading and BARO C Sensor reading | > 15.0 kPa | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 160 failures out of 200 samples<br><br>1 sample every 25 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Inlet Airflow System Performance (naturally aspirated) | P1101 | Detects a performance failure in the Manifold Pressure (MAP) sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern.<br><br>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these three sensors.<br><br>These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the system, but no | Filtered Throttle Model Error<br><br>AND<br><br>ABS(Measured Flow - Modeled Air Flow) Filtered<br>OR<br>ABS(Measured M A P - MAP Model 1) Filtered<br><br>AND<br><br>ABS(Measured M A P - MAP Model 2) Filtered | > 250 kPa*(g/s)<br><br><br><br>> 25.0 grams/sec<br><br><br>> 22.0 kPa )<br><br><br><br>> 22.0 kPa | Engine Speed<br>Engine Speed<br><br>(Coolant Temp<br>OR<br>OBD Coolant Enable Criteria<br><br>(Coolant Temp<br>OR<br>OBD Max Coolant Achieved<br><br>Intake Air Temp<br>Intake Air Temp<br><br>Minimum total weight factor (all factors multiplied together)<br><br>See Residual Weight Factor tables. | >= 0 RPM<br><= 5,400 RPM<br><br>>= -9 Deg C<br><br><br>= TRUE)<br><br><= 130 Deg C<br><br><br>= FALSE)<br><br>-20 Deg C<br><= 129 Deg C<br><br><br><br>>= 0.50<br><br>Filtered Throttle Model Error multiplied by<br>**P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**<br><br>Modeled Air Flow Error multiplied by<br>**P0101, P0106, P010B, P0121, P012B, P0236, P1101:MAF1 Residual Weight Factor based on RPM**<br>and<br>**P0101, P0106, P010B, P0121, P012B, P0236, P1101:MAF1 Residual Weight Factor based on MAF Est** | Continuous<br><br>Calculation are performed every 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail. | | | | MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM**<br><br>MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** | | |
| | | | | | No Active DTCs: | MAP_SensorCircuitFA<br>EGRValvePerformance_FA<br>MAF_SensorCircuitFA<br>CrankSensor_FA<br>ECT_Sensor_FA<br>IAT_SensorFA | | |
| | | | | | No Pending DTCs: | EGRValve_FP<br>ECT_Sensor_Ckt_FP<br>IAT_SensorCircuitFP | | |
| | | | | | Diagnostic is Enabled | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT SIDI High Pressure Rail Temperature Sensor Performance | P111F | This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2) | Fuel Temperature Error (Absolute delta between sensori and sensor2) | > 20.00 degC | Fuel Temperature Rationality Diagnostic Enabled<br><br>No Fault Active on<br><br>No Fault Pending on | True<br><br>Enabled when a code clear is not active or not exiting device control<br><br>Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182)<br><br>Temperature sensors 2 out of range Low or High (P0187, P0188)<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>SENT Intenal Error Fault Active (P126E, P126F)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D)<br><br>SENT Communication Fault Pending (U0625, U101B, U0670, U0671)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D) | 100.00 failures out of 125.00 samples<br><br>100 ms per Sample Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module 5V Reference 1 Circuit | P1176 | This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 1 Circuit. | Raw Fuel Pump Driver Control Module 5V Reference 1 is<br><br>or<br><br>Raw Fuel Pump Driver Control Module 5V Reference 1 is<br><br>or<br><br>Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is<br><br>For a non-continuous failure of<br><br>out of<br><br>For a continuous failure of | >92.25 Percent<br><br><87.75 Percent<br><br>>99.00 Percent<br><br>40.00 counts<br><br>80.00 counts<br><br>0.20 seconds | Diagnostic is enabled<br><br>Run/Crank Ignition Voltage<br><br>PT Sensor Bus Relay<br><br>The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active:<br><br>P165C<br><br>U0076<br><br>U18A2 | Enabled<br><br>>=11.00 Volts<br><br>Commanded on (if present) | Samples every 12.50 milliseconds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module 5V Reference 2 Circuit | P1177 | This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 2 Circuit. | Raw Fuel Pump Driver Control Module 5V Reference 2 is<br><br>or<br><br>Raw Fuel Pump Driver Control Module 5V Reference 2 is<br><br>or<br><br>Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 2 and Raw Fuel Pump Driver Control Module 5V Reference 2 is<br><br>For a non-continuous failure of<br><br>out of<br><br>For a continuous failure of | >92.25 Percent<br><br><87.75 Percent<br><br>>99.00 Percent<br><br>40.00 counts<br><br>80.00 counts<br><br>0.20 seconds | Diagnostic is enabled<br><br>Run/Crank Ignition Voltage<br><br>PT Sensor Bus Relay<br><br>The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active:<br><br>P165C<br><br>U0076<br><br>U18A2 | Enabled<br><br>>=11.00 Volts<br><br>Commanded on (if present) | Samples every 12.50 milliseconds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit | P1178 | This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit | Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is<br><br>or<br><br>Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is<br><br>or<br><br>Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is<br><br>For a non-continuous failure of<br><br>out of<br><br>For a continuous failure of | >92.25 Percent<br><br><87.75 Percent<br><br>>99.00 Percent<br><br>40.00 counts<br><br>80.00 counts<br><br>0.20 seconds | Diagnostic is enabled<br><br>Run/Crank Ignition Voltage<br><br>PT Sensor Bus Relay<br><br>The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active:<br><br>P1200<br><br>U0076<br><br>U18A2 | Enabled<br><br>>=11.00 Volts<br><br>Commanded on (if present) | Samples every 250.00 milliseconds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 low side circuit shorted to high side circuit | P1248 | Controller specific output driver circuit diagnoses injector 1 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 low side circuit shorted to high side circuit | P1249 | Controller specific output driver circuit diagnoses injector 2 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 low side circuit shorted to high side circuit | P124A | Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 low side circuit shorted to high side circuit | P124B | Controller specific output driver circuit diagnoses injector 4 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 low side circuit shorted to high side circuit | P124C | Controller specific output driver circuit diagnoses injector 5 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 low side circuit shorted to high side circuit | P124D | Controller specific output driver circuit diagnoses injector 6 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 low side circuit shorted to high side circuit | P124E | Controller specific output driver circuit diagnoses injector 7 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 low side circuit shorted to high side circuit | P124F | Controller specific output driver circuit diagnoses injector 8 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold | Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure. | 25 amp >= through low side driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Over Temperature | P1255 | To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions.<br><br>The FTZM ERFS control may adjust the PWM slew rate or frequency as a self-protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over-temperature condition. | Fuel Pump Driver Temperature | T > 160 degC | a) Diagnostic is ..<br><br>b) Sensor Bus Relay On<br><br>c) CAN Sensor Bus message $3EC_Available<br><br>d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr] | a) Enabled<br><br>b) == TRUE<br><br>c) == TRUE<br><br>d) <> TRUE | 5.00 failures/ 10.00 samples<br><br>1 sample / 100 millisec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code | P126E | This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure | Fuel Temperature Sensor 1 SENT digital read value | >= 4,089.00 | No Fault Active on<br><br>No Fault Pending on | Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C) | 50.00 failures out of 62.00 samples<br><br>100 ms per Sample Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code | P126F | This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure | Fuel Temperature Sensor 2 SENT digital read value | >= 4,089.00 | No Fault Active on<br><br>No Fault Pending on | Enabled when a code clear is not active or not exiting device control<br><br>SENT Communication Fault Active (U0625, U101B, U0670, U0671)<br><br>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)<br><br>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D) | 50.00 failures out of 62.00 samples<br><br>100 ms per Sample Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail High Pressure Sensor 2 Out of Range | P127C | This DTC diagnose SENT high pressure sensor 2 that is too low out of range.<br><br>If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold. | High Pressure Rail Sensor 2 SENT digital read value | =< 94 | | | Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure Sensor 1 Internal Performance | P128A | This DTC determines if there is internal error within the SENT pressure sensor 1 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU. | Digital pressure sesnor 1 value | >= 4,089 | SENT Fuel Rail Pressure Sensor Internal Performance Enable<br>No Fault Pending | Enabled when a code clear is not active or not exiting device control<br>True<br>U0625<br>P16E5<br>P128F | 400 failures out of 500 samples<br>6.25 ms per Sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure Sensor 2 Internal Performance | P128B | This DTC determines if there is internal error within the SENT pressure sensor 2 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU. | Digital pressure sesnor 2 value | >= 4,089 | SENT Fuel Rail Pressure Sensor Internal Performance Enable<br>No Fault Pending | Enabled when a code clear is not active or not exiting device control<br>True<br>U0625<br>P16E5<br>P128F | 400 failures out of 500 samples<br>6.25 ms per Sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure &Temperature Sensor Temperature 1 Message Incorrect | P128C | This DTC diagnoses the the communication errors on the temperature 1 serial data channel | Serial Message 1 Age | >= 0.03 ms | SENT signal Serial waveform diagnostics enable<br><br>SENT power up delay<br><br>No Fault Active | True<br><br>>=0.00 seconds<br><br>U0625<br>P16E5 | 134 failures out of 167 samples<br><br>6.25 ms per sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect | P128D | This DTC diagnoses the the communication errors on the temperature 2 serial data channel | Serial Message 2 Age | >= 0.03 ms | SENT signal Serial waveform diagnostics enable<br><br>SENT power up delay<br><br>No Fault Active | True<br><br>>=0.00 seconds<br><br>U0625<br>P16E5 | 134 failures out of 167 samples<br><br>6.25 ms per sample<br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SENT Fuel Rail Pressure & Temperature Sensor Pressure Message Incorrect | P128F | This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few pulse, clock shift). The SENTHWIO Determines message waveform fault (i.e.too many pulse, too few pulse, clock shift) and if the message age is too long. | SENT HWIO Determines message fault (i.e.too many pulse, too few pulse, clock shift)<br><br>Message Age | = true<br><br>> 1.69 ms | SENT signal Serial waveform diagnostics enable<br><br>SENT power up delay<br><br>No Fault Active on | True<br><br>>= 0.00 seconds<br><br>Enabled when a code clear is not active or not exiting device control<br><br>U0625<br>P16E5 | 400 failures out of 500 samples<br><br>6.25 ms per sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect | P129F | FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed | Sensed Filtered Fuel Pump Speed Error | > Speed Error Low Threshold [Supporting Table] **P129F Threshold Low**<br><br>OR<br><br>< Speed Error High Threshold [Supporting Table] **P129F Threshold High** | a) Diagnostic is ..<br>b) CAN Sensor Bus message $0CB_Available<br>c) FABR Fuel Control Enable Fault Active<br>d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr]<br>e) FABR Fuel Pump Ckt FA<br>f) FABR Driver OverTemp FA<br>g) Run_Crank input Voltage<br>h) Sensor Bus Relay On<br>j) CAN Sensor Bus message $0CB Data Fault [CFMR_b_FTZM_Info8_ARC_ChkErr]<br>k) CAN Sensor Bus message $0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA]<br>l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA]<br>m) Timer - FABR Rising Edge Diagnostic Delay<br>n) Timer - FABR Falling Edge Diagn Delay | a) Enabled<br>b) == TRUE<br>c) <> TRUE<br>d) <> TRUE<br>e) <> TRUE<br>f) <> TRUE<br>g) > 9.00 volts<br>h) == TRUE<br>j) <> TRUE<br>k) <> TRUE<br>l) <> TRUE<br>m) > 2.20 seconds<br>n) > 1.00 seconds | 1 sample / 12.5 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Rationality Diagnostic fault. Reported fuel pump speed data will only be consumed in this same diagnostic. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Enable Circuit Performance | P12A6 | The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance diagnostic is to detect if the state of the fuel control enable circuit is valid. This is done by comparing the fuel control enable circuit state [high or low] sensed by the Fuel TankZone Module device to the commanded state of the fuel control enable signal from the ECM [in serial data]. When the sensed state does not match the commanded state, the fail counter increments. | Sensed Fuel Control Enable circuit state<br><br>[Fuel TankZone Module device] | <> Fuel Control Enable Active command<br><br>[serial data] | a) Diagnostic is ..<br><br>b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr]<br><br>c) CAN Sensor Bus message $OCC_Available<br><br>d) Sensor Bus Relay On<br><br>e) Timer [FABR t RunCrankActive ] | a) Enabled<br><br>b) <> TRUE<br><br>c) == TRUE<br><br>d) == TRUE<br><br>e) >= 0.51 seconds | 40.00 failures / 80.00 samples<br><br>1 sample / 12.5 millisec | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Coil Positive Voltage Circuit Group 1 * :?IDI ONLY | P135A | This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse. | Ignition Module Supply Voltage. | < 2.5 Volts | Diagnostic Enabled?<br><br>Three possible Ignition Coil Power Sources (only 1 used):<br><br>Ignition Coil Power Source =<br><br><u>Case 1: Battery</u><br>Delay starting at Key-On<br><br><u>Case 2: Ignition Run/ Crank</u><br>Ignition Run/Crank Voltage<br><br><u>Case 3: PT Relay</u><br>PT Relay Voltage | Yes<br><br>PT Relay (Case 3)<br><br>5 Engine Revs<br><br>> 5.0 volts<br><br>>11.0 volts | 50 Failures out of 63 Samples<br><br>6.25 msec rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Coil Positive Voltage Circuit Group 2 * :?IDI ONLY | P135B | This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse. | Ignition Module Supply Voltage. | < 2.5 Volts | Diagnostic Enabled? | Yes | 50 Failures out of 63 Samples<br><br>6.25 msec rate | Type: Type A, 1 Trips |
| | | | | | Three possible Ignition Coil Power Sources (only 1 used): | | | |
| | | | | | Ignition Coil Power Source = | PT Relay (Case 3) | | |
| | | | | | <u>Case 1: Battery</u><br>Delay starting at Key-On | 5 Engine Revs | | |
| | | | | | <u>Case 2: Ignition Run/ Crank</u><br>Ignition Run/Crank Voltage | >5.0 volts | | |
| | | | | | <u>Case 3: PT Relay</u><br>PT Relay Voltage | >11.0 volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Emissions Reduction System Fault | P1400 | Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance.<br>Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range. | Average desired accumulated exhaust power - Average actual accumulated exhaust power<br>(too much energy delivered to catalyst)<br><br>Average desired accumulated exhaust power - Average actual accumulated exhaust power<br>(too little energy delivered to catalyst)<br><br>(EWMA filtered)<br><br>Average Power = output of **P1400_EngineSpeedResidual_Table**<br>* output of **P1400_SparkResidual_Table**<br>NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed.<br>Refer to the Supporting Tables for details | < -32.00 KJ/s (high RPM failure mode)<br><br>> 5.00 KJ/s (low RPM failure mode) | To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:<br><br>Catalyst Temperature<br>AND<br>Engine Coolant<br>AND<br>Engine Coolant<br>AND<br>Barometric Pressure<br><br>The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:<br><br>Catalyst Temperature<br>AND<br>Engine Run Time<br><br>OR<br><br>Engine Run Time<br><br>OR<br><br>Barometric Pressure | < 550.00 degC<br><br>> -12.00 degC<br><br><= 66.00 degC<br><br>>= 70.00 KPa<br><br>>= 800.00 degC<br><br>>= 1.00 seconds<br><br>> **P1400_CatalystLightOffExtendedEngineRunTimeExit**<br><br>This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.<br><br>< 70.00 KPa | Runs once per trip when the cold start emission reduction strategy is active<br><br>Frequency: 100ms Loop<br><br>Test completes after 10 seconds of accumulated qualified data. | EWMA Based - Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Other Enable Criteria: | | | |
| | | | | | OBD Manufacturer Enable Counter | 0 | | |
| | | | | | Vehicle Speed | <1.86MPH | | |
| | | | | | Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal | 0<br><br>(A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle) | | |
| | | | | | A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the: | | | |
| | | | | | Pedal Close Delay Timer | > 2.00 seconds | | |
| | | | | | the diagnostic will continue the calculation. | | | |
| | | | | | A change in gear will initiate a delay in the calculation of the average qualified residual value to | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the: | | | |
| | | | | | Gear Shift Delay Timer | > 1.50 seconds | | |
| | | | | | the diagnostic will continue the calculation | | | |
| | | | | | For Manual Transmission vehicles: | | | |
| | | | | | Clutch Pedal Position | > 12.00% | | |
| | | | | | Clutch Pedal Position | <75.00% | | |
| | | | | | The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. | | | |
| | | | | | The time weighting factor must be : | >0<br>These are scalar values that are a function of engine run time. Refer to | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime** and the cal axis, **P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis** in the "Supporting Tables" for details. | | |
| | | | | | General Enable: | | | |
| | | | | | DTC's Not Set: | AcceleratorPedalFailure<br>ECT_Sensor_FA<br>IAT_SensorCircuitFA<br>MnfdTempSensorCktFP<br>CrankSensor_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>MAP_SensorFA<br>EngineMisfireDetected_FA<br>ClutchPstnSnsr FA<br>IAC_SystemRPM_FA<br>IgnitionOutputDriver_FA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>5VoltReferenceMAP_OOR_Flt<br>TransmissionEngagedState_FA<br>EngineTorqueEstInaccurate | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Level SensorA Reference Feedback Range/ Performance<br><br>[For use on vehicles with FTZM] | P1434 | This DTC will detect a fault in Primary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device | Reference Voltage 0 Period Error Maximum<br><br>[Measured Ref V Period - Commanded Ref V Period] | > 25.00 millisec | a] CAN serial data available [$2D7]<br><br>b] Calibration - Reference Voltage Command Source<br><br>c] Timer - Reference Voltage Pulse Width Available Synchronization<br><br>d] Timer - Reference Voltage Period Available Delay<br><br>e] Diagnostic System Disabled<br><br>f] FTZM Serial Data Info4 Rolling Counter Check Error<br><br>g] Reference Voltage Performance 0 Diagnostic Enabled | a] — True<br><br>b] == ECM<br><br>c] > 1.25 sec<br><br>d] > 0.75 sec<br><br>e] <> True<br><br>f] <> True<br><br>g] == TRUE | 250 ms /sample | Type B, 2 Trips |
| | | | Reference Voltage 0 Pulse Width Error Maximum<br><br>[Measured Ref V PW - Commanded Ref V PW] | > 1.50 millisec | a] CAN serial data available [$2D7]<br><br>b] Calibration - Reference Voltage Command Source<br><br>c] Timer - Reference Voltage Pulse Width Available Synchronization<br><br>d] Timer - Reference Voltage Period Available Delay<br><br>e] Diagnostic System Disabled | a] — True<br><br>b] == ECM<br><br>c] > 1.25 sec<br><br>d] > 0.75 sec<br><br>e] <> True | 250 ms /sample<br><br>16 Failures/ 20 Samples | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | f] FTZM Serial Data Info4 Rolling Counter Check Error<br><br>g] Reference Voltage Performance 0 Diagnostic Enabled | f] <> True<br><br>g] == TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Configuratio n Command Signal 1 Message | P14CD | This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Command Signal 1. | The Fuel TankZone Module has determined that signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM)of Fuel Pump Driver Control Module Configuration Command Signal 1 Message transmitted by the Engine Control module is incorrect and sends a fail status back to the ECM for | >= 15.00 counts out of >= 16.00 counts | Diagnostic is enabled<br><br>Message frame from the Fuel TankZone Module containing the diagnostic status is received<br><br>All the following conditions are met for:<br><br>Battery Voltage<br><br>Sensor bus relay is on (if present) | Enabled<br><br>>= 3,000.00 milliseconds<br><br>>=11.00 Volts | Samples every 15.00 milliseconds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Driver Control Module Configuratio n Command Signal 5 Message | P14D6 | This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Command Signal 5. | The Fuel TankZone Module has determined that signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM)of Fuel Pump Driver Control Module Configuration Command Signal 5 Message transmitted by the Engine Control module is incorrect and sends a fail status back to the ECM for | >=8.00 counts<br>out of<br>>= 10.00 counts | Diagnostic is enabled<br><br>Message frame from the Fuel TankZone Module containing the diagnostic status is received<br><br>All the following conditions are met for<br><br>Battery Voltage<br><br>Sensor bus relay is on (if present) | Enabled<br><br>>= 3,000.00 milliseconds<br><br>>=11.00 Volts | Samples every 250.00 milliseconds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Throttle Position Steady State Actuation Fault | P1516 | Detect an inablity to maintain a steady state throttle position. | The absolute difference between desired and indicated throttle position is > | 2.00% | Run/Crank voltage<br>TPS minimum learn is not active AND Throttle is being Controlled<br>Throttle is considered in a steady state condition when the desired throttle position over a 12.5 ms period is<br>For a settling time period<br>Ignition voltage failure is false | > 6.41 Volts<br>< 0.25 percent<br>> 4.00 seconds<br>P1682 | 0.49 ms | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Switch State Undertermined Legacy | P155A | Detects when cruise switch state cannot be determined, such as low voltage conditions<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch “Data Invalid” (latched on/off switch architectures) or “Indeterminate” (momentary on/off switch architectures) is detected for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." | cruise switch state is received as "undetermined" for greater than a calibratable time | fail continuously for greater than 3.00 seconds | Diagnostic is enabled. | | fail continuously for greater than 3.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Set/ Coast Signal 2 Circuit | P155B | Detects a failure of the cruise set 2 switch in a continously applied state<br><br>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is stuck in Decrease High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture. | Cruise Control Set 2 switch remains applied for greater than a calibratable period of time. | fail continuously in the applied state for greater than 89.00 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 89.00 seconds | TypeC, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cruise Control Resume/ Acceleration Signal 2 Circuit | P155C | Detects a failure of the cruise resume 2 switch in a continously applied state<br><br>"Emissions Neutral Default Action: When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in Increase High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." | Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time. | fail continuously in the applied state for greater than 89.00 seconds | Diagnostic is enabled.<br><br>CAN cruise switch diagnostic enable in ECM | 1.00 | fail continuously for greater than 89.00 seconds | TypeC, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C" |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Wheel Speed Sensor Sequence Number Incorrect | P15FD | This DTC monitors wheel speed signals for an incorrect sequence | Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect.<br>A complete set of sequence numbers has not been received for<br><br>and this state is continuous for<br><br>out of a total sample time of | > 10.00 seconds<br><br>>4.00 seconds<br><br>> 5.00 seconds | Sequence Number Error DTC is enabled<br><br>Power Mode<br><br>Run/Crank Ignition Voltage<br><br>Driven and non-driven wheel rotational status is currently being received and not failsoft. | Enabled<br><br>= Run or Crank<br><br>>=11.00 Volts | Diagnostic executes in 25ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Secondary Transmission Range Selector Position Message Sequence Number Incorrect | P15FE | Coherency number is a four-bit rolling counter appended to the CAN data frames as time stamps. Every time a newer and more updated version of a CAN frame is sent, the rolling counter is incremented by one. After 15 it restarts from 0.<br><br>For safety and redundancy, each of the X and Y position sensor data is sent over two CAN buses in two CAN buses at the same time. Since CAN transmission is not perfectly synchronized, at the receiver side the parallel streams of arriving CAN frames are compared. When two CAN frames are compared, if the coherency numbers are different by more than 2 counts, then this DTC is set. If not, then the two CAN data streams are aligned with each other to be in time synch at the receiver side. | The coherency numbers on the two CAN frames arriving in two CAN buses differ by more than<br><br>OR:<br><br>the four-bit coherency sequence of one of the CAN frames is: | 2 counts<br><br>Unable to be aligned due to repeat values | Diagnostic enabling calibration:<br><br>Reception of data through secondary bus is:<br><br>Run/Crank Active Signal | 1.00<br><br>Enabled<br><br>Run or Crank | An X out of Y scheme is used:<br><br>Fail counter threshold = 20.00<br><br>Sample counter threshold = 25.00 | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module SIDI High Pressure Pump current monitor | P163A | This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags | SIDI fuel pump High Current Test<br><br>Current<br><br>SIDI fuel pump Low Current Test<br><br>Current | <br><br><br>>= 11.00 Amps<br><br><br><br><= 0.10 Amps | Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) and<br>Cam or Crank Sensor Not FA and<br>IAT,IAT2,ECTNot FAand<br>Low side Fuel Pump Relay ckt Not FAand<br>Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false andEngine movement detected is true and<br>Manufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA | >= 11 Volts<br><br>> 0.180 MPa<br><br>Enabled when a code clear is not active or not exiting device control<br>Engine is not cranking | Current High/ Low<br><br>10 seconds failures out of 12.50 seconds sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ignition voltage out of correlation error(P1682) not active and<br><br>Barometric Pressure<br>Inlet Air Temp<br>Fuel Temp | <br><br><br>>= 70.0 KPA<br>>= -20.0 degC<br>-12 <= TempdegC <= 132 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Voltage Correlation | P1682 | Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. | \|Run/Crank- PT Relay Ignition] > | 3.00 Volts | Powertrain Relay commanded on<br><br>AND<br><br>kun/Crank voltage ><br><br>OR<br><br>PT Relay Ignition voltage ><br><br>)<br><br>AND<br><br>Run/Crank voltage > | <br><br><br><br>Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)**<br><br><br><br>5.50 Volts<br><br><br><br>5.50 Volts | 240/480 counts; or<br><br>0.175 sec continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Voltage Correlation #2 | P16A7 | Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2. | \|Run/Crank- PT Relay Ignition] > | 3.00 Volts | Powertrain Relay commanded on<br><br>AND<br><br>kun/Crank voltage >\|<br><br>OR<br><br>PT Relay Ignition voltage >\|<br><br>)<br><br>AND<br><br>Run/Crank voltage > | <br><br><br><br>Table, f(IAT). See supporting tables: **P16A7_PT Relay Pull-in Run/Crank Voltage f(IAT)**<br><br><br><br>5.50 Volts<br><br><br><br>5.50 Volts | 240/480 counts; or<br><br>0.175 sec continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III and beyond controllers ONLY) | P16AF | Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value. | Engine controls ignition relay feedback circuit 2 low voltage | Relay voltage <= 5.00 | Powertrain relay low diag enable<br><br>Powertrain relay voltage<br><br>Run Crank voltage<br><br>Powertrain relay state | = 1.00<br><br>>=11.00<br><br>>9.00<br><br>= ON | 5 failures out of 6 samples<br><br>1000 ms/ sample | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Controls Ignition Relay Feedback Circuit 2 High Voltage -(GEN III and beyond controllers ONLY) | P16B3 | Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive. | Engine controls ignition relay feedback circuit 2 high voltage | Relay voltage >=4.00 | Powertrain relay high diag enable<br><br>Powertrain relay state | = 1.00<br><br>= INACTIVE | 50 failures out of 63 samples<br><br>100 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Voltage Correlation #3 | P16BC | Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2 | \|Run/Crank- PT Relay Ignition] > | 3.00 Volts | Powertrain Relay commanded on<br><br>AND<br><br>kun/Crank voltage ><br><br>OR<br><br>PT Relay Ignition voltage ><br><br>)<br><br>AND<br><br>Run/Crank voltage > | <br><br><br><br>Table, f(IAT). See supporting tables: **P16BC_PT Relay Pull-In Run/Crank Voltage f(IAT)**<br><br><br><br>5.50 Volts<br><br><br><br>5.50 Volts | 240/480 counts; or<br><br>0.175 sec continuous;<br><br>12.5 ms/count in main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Controls Ignition Relay Feedback Circuit 3 Low Voltage - (GEN IV and beyond controllers ONLY) | P16BD | Detects low voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value. | Engine controls ignition relay feedback circuit 3 low voltage | Relay voltage <= 5.00 | Powertrain relay low diag enable<br><br>Powertrain relay voltage<br><br>Run Crank voltage<br><br>Powertrain relay state | = 1.00<br><br>>=11.00<br><br>>9.00<br><br>= ON | 5 failures out of 6 samples<br><br>1000 ms/ sample | TypeC, 1 Trip No MIL Emissio ns Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Controls Ignition Relay Feedback Circuit 3 High Voltage - (GEN IV and beyond controllers ONLY) | P16BF | Detects high voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive. | Engine controls ignition relay feedback circuit 3 high voltage | Relay voltage >=4.00 | Powertrain relay high diag enable<br><br>Powertrain relay state | = 1.00<br><br>= INACTIVE | 50 failures out of 63 samples<br><br>100 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Sensor Bus Relay Control Circuit | P16D7 | Detects an open circuit in the sensor bus relay circuit. This diagnostic reports the DTC when an open circuit is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 K Q ohms impedance between output and controller ground | Sensor Bus relay circuit open diagnostic = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage > 11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low). |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Sensor Bus Relay Control Circuit Low | P16D8 | Detects a short to ground in the sensor bus relay circuit. This diagnostic reports the DTC when a short to ground is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to ground: < 0.5 Q impedance between output and controller ground | Sensor Bus relay circuit short to ground diagnostic = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage >11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips<br><br>Note: In certain controlle rs P16D7 may also set (Sensor Bus Relay Control Circuit Open). |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Sensor Bus Relay Control Circuit High | P16D9 | Detects a short to power in the sensor bus relay circuit. This diagnostic reports the DTC when a short to power is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to power:<br>< 0.5 Q impedance between output and controller power | Sensor Bus relay circuit short to power diagnostic = TRUE<br><br>Run/Crank Voltage | 1.00<br><br>Voltage >11.00 volts | 8 failures out of 10 samples<br><br>250 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Transmission Range Control Performance | P16F4 | Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition | Driver Requested Arbitrated Range Commanded<br><br>OR:<br><br>Transmission range control routine<br><br>Transmission range control routine<br><br>Transmission range control routine | is issued unexpectedly<br><br>OR<br><br># expected range<br><br>Does not issue Park or Neutral command quickly enough in response to driver request<br><br>Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1.<br><br>Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2. | TRCR Global Diagnostic Enable<br><br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when RunCrankActive until ActualRange<br>AND<br>Accessory/Wakeup | = True<br><br>=False<br><br>=False<br><br>=True<br><br>= True<br><br>=True<br>=Park<br><br>=False | 200, 200, 200,2,050, 200 or 200 msec, depending on conditions.<br><br>T1 = 200 msec<br><br>T2 = 200 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unexpected Range Change Detected | P1787 | Detects an unexpected change in transmission range. | Actual Arbitrated Transmission Range<br><br>The internal system only diagnoses range changes in and out of Park. | # Previous Value and # Commanded Range | Actual Tranmission Range<br><br>Range Change Achievement Diag | = Valid Range<br><br>= Not running | 1,500 ms | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Current Transmissio n Range Unknown | P1789 | Detects the failure of the ETRS system to identify the current transmission range with sufficient confidence. | Actual Transmission Range | = Undefined | Range Indication Source<br><br>AND<br>CodeClearFunction<br>AND<br>ManufacturingModeActive<br>AND:<br><br>External:<br>Run/Crank<br>OR<br>Accessory/Wakeup<br><br>Internal:<br>From the time when<br>RunCrankActive<br>until ActualRange<br>AND<br>Accessory/Wakeup | = Valid<br><br>=False<br><br>=False<br><br>=True<br><br>= True<br><br>=True<br>=Park<br><br>=False | 80 failures out of 100 samples<br><br>12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch A Circuit Low | P17A3 | Detects Selector Enable Switch A circuit reading low | Shift Enable Switch Measured Voltage Percent | < Low 446 counts<br><br>1023 counts = 5 Volts | | | 16 Failures out of 20 Samples (5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch A Circuit High | P17A4 | Detects Selector Enable Switch A circuit reading high | Selector Enable Switch Measured Voltage Percent | > High = 853 counts<br><br>853 counts = 83.3% of 5 Volts.<br>1023 Counts = 5 V | | | 16 Failures out of 20 Samples (5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch A Circuit Performance | P17A5 | Detects Selector Enable Switch A circuit reading outside "Released" or "Pressed" values | Selector Enable Switch Measured Voltage | (544<X<753 counts)<br><br>53.2% < X < 73.7% of 5 Volts.<br>1023 Counts = 5 V | Not Fault Active | P17A4, P17A3 | 100 Failures out of 120 Samples =500 msec (5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch A/B Correlation | P17A6 | Correlation diagnosic compares both switches | Measured Voltage Percent of Selector Enable Switch A and Switch B | Are both VALID, (Release or Pressed), but disagree.<br><br>Pressed: 49% -61%<br><br>Released: 70% -82% | Interlock comparison diagnostic enabling calibration =<br><br>The controller has been awake for at least: | 1.00<br><br>=0.05 seconds | 12.5 ms rate<br><br>24,000.00 failures out of 24,000.00 samples | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch B Circuit Low | P17A7 | Detects Selector Enable Switch B circuit reading low | Selector Enable Switch Measured Voltage | < Low 446 counts<br>446 counts = 43.6% of 5 Volts.<br><br>1023 Counts = 5 V | | | 16 Failures out of 20 Samples (5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch B Circuit High | P17A8 | Detects Selector Enable Switch B circuit reading high | Selector Enable Switch Measured Voltage | > High 853 counts<br>853 counts = 83.3% of 5 Volts.<br><br>1023 Counts = 5 V | | | 16 Failures out of 20 Samples (5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch B Circuit Performance | P17A9 | Detects Selector Enable Switch B circuit reading outside "Released" or "Pressed" values | Selector Enable Switch Measured Voltage | (544<X<753 counts)<br><br>53.2% < X < 73.7% of 5 Volts.<br><br>1023 Counts = 5 V | Not Fault Active | P17A8, P17A7 | 100 Failures out of 120 Samples =500 msec<br><br>(5 msec loop) | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transfer Case Control Module Transfer Case Command State Rationality - 4WD high or 4WD low command not 4wd high or 4WD low ratio | P17D4 | The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is 4WD neutral ratio, while, the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors. | transfer case contol module transfer case command state<br><br>AND<br><br>measured transfer case ratio is NOT in 4WD low ratio window<br>AND<br>measured transfer case ratio is NOT in 4WD high window<br><br>AND<br><br>measured transfer case ratio is NOT in 4WD low ratio window<br>AND<br>measured transfer case ratio is NOT in 4WD high window<br><br>OR<br><br>vehicle is stopped:<br>transfer case output shaft speed<br>transmission output shaft speed<br>vehicle stopped secondary parameter thresholds met<br><br>(measured transfer case ratio = transmission output speed / transfer case output speed) | # 4WD neutral<br><br>4WD low ratio window<br>< 3.00<br>> 2.40<br><br>4WD high ratio window<br><1.30<br>> 0.70<br><br>> 2.90<br>< 2.00<br><br>> 1.20<br>< 0.80<br><br>< 10.0 RPM<br><br>> 500.0 RPM | vehicle stopped:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>accelerator pedal position<br><br>brake pedal position<br><br>transmssion gear is forward gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>accelerator pedal position<br><br>brake pedal position<br><br>transmssion gear is reverse gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>accelerator pedal position<br><br>brake pedal position<br><br>diagnsotic monitor enable<br>PTO active<br>engine power limited<br><br>DTCs not fault active | > 500.0 RPM<br>> 100.0 Nm<br>> 300.0 RPM<br>> 5.0 % hysteresis high<br>NOT < 3.0 % hysteresis low<br><br>< 100.0 %<br><br>> 500.0 RPM<br>> -20.0 Nm<br>> 0.0 RPM<br>> 0.0 % hysteresis high<br>NOT < 0.0 % hysteresis low<br><br>< 100.0 %<br><br>> 500.0 RPM<br>> 90.0 Nm<br>> 300.0 PRM<br>> 6.0 % hysteresis high<br>NOT < 3.0 % hysteresis low<br><br>< 100.0 %<br><br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>P057B, P057C, P057D, P057E,<br>P279A, P279B, P279C, P0502, P0503, P0722, | fail count > 840.00 counts<br>out of sample count > 1,200.00 counts<br><br>update rate 12.5 milliseconds for 1 count | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | update rate 12.5 milliseconds | | | P0723, P2160, P2161 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Memory Checksum Error | P17D8 | [1] This DTC will be stored if any software orcalibration check sum is incorrect.<br><br>[2] Circuit Monitor mismatch occurs | [1] Calculated Checksum<br><br>[2] Switch circuit calculated values: | # stored checksum for any of the parts (boot, software, application calibration, system calibration)<br><br># switch circuit monitor values | Ignition<br><br>OR<br><br>Accessory | Run or Run/Crank<br><br>ON | [1] 1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures<br><br>Frequency: Runs continuously in the background<br><br>[2] Test runs during calculation of switch circuit values | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Read Only Memory (ROM) Error | P17D9 | Reports a failure if the BIST (=Built in Self Test) for<br>[1] the ROM checksum or<br>[2] the ROM Error correcting code (ECO) check fails. | [1] Checksum at power-up<br><br>[2] ROM ECC | # checksum at power-down<br><br>= fault | Ignition<br><br>OR<br>Accessory: | Run or Run/Crank<br><br>ON | [1] 1 failure Frequency: Once at power-up<br><br>[2] 1 failure Frequency: Runs continuously in the background | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error | P17DA | Indicates that control module is unable to correctly write and read data to and from RAM. | Data read | # Data written | Ignition:<br><br>OR<br><br>Accessory | Run or Run/Crank<br><br><br><br>ON | 1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures<br><br>This test runs continuously in the background | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Processor | P17DB | Indicates the ECU has detected an internal processor fault.<br>This DTC is dependent on the microprocessor and includes self testing not listed.<br><br>[1] Microprocessor ALU Integrity Diagnostic Monitor Algorithm<br>[2] Main Processor Configuration Register Test<br>[3] Seed and Key fault (Set by ECM when seeds and keys do not match)<br>[4] Stack overflow<br>[5] Program Counter Exception Error<br>[6] Watchdog Fails to reset | [1] Calculated key from rolling seed<br><br>[2] Processor register<br><br>[3] <This test has no threshold value.><br><br>[4] Unused stack memory above maximum stack used<br><br>[5] Illegal instruction loaded into program counter<br><br>[6] Set when a fault that should cause a reset fails to cause a reset. | [1] # expected key<br><br>[2] # expected processor register value<br><br>[3] No threshold value<br><br>[4] # initialized special pattern<br><br>[5] No threshold value<br><br>[6] No threshold value | For all six cases:<br><br>Ignition<br><br>Accessory | For all six cases:<br><br>Run or Run/Crank<br><br>OR<br><br>ON | [1] 1 failure<br>Test runs continuously (20ms loop or less)<br><br>[2] 1 failure<br>Test runs continuously (20ms loop or less)<br><br>[3] 1 failure<br>Test runs continuously (25ms loop or less)<br><br>[4] 1 failure<br>Test run by OS on task switches<br><br>[5] 1 failure<br><br>[6] 1 failure | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Ignition On/ Start Switch Circuit Low | P17E0 | Detects if the IgnitionI Switch circuit is shorted to low or open | Ignition 1 voltage | <=6 V | Engine Controller Run Crank Terminal Status - CAN Message | = 1 indicating RUN/ CRANK | 4.5 sec in 5.5 second window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Ignition On/ Start Switch Circuit High | P17E1 | Detects if the IgnitionI Switch circuit is shorted to vehicle supply voltage | Ignition 1 voltage | > 11.7V | Engine Controller Run Crank Terminal Status - CAN Message | = 0, indicating NOT RUN/CRANK | 8 sec in 10 second window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Switch A/B Circuit Stuck On | P17F3 | Checks if both Park switches are stuck closed | Both Park Switches are PRESSED | > 1.00 seconds | Not Fault Active<br><br>Controller is "on" | P07B3, P07B4, P07B4, P07B9, P07BA, P07BB<br><br>>~ 100 ms | 4,800.00 failures out of 6,000.00 samples | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Enable Switch A/B Circuit Stuck On | P17F4 | Checks if enable switch is stuck pressed. | Enable Switch A or B are PRESSED | > 1.00 seconds | Enabled via calibration<br><br>Controller is | 1.00<br><br>"On" | 24,000.00 failures out of 30,000.00 samples | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Position Switch A/B Circuit Stuck Off | P189D | Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states | [1] The number of Park button Press<br><br>AND<br><br>Switch-1-Closed count<br><br>AND<br><br>Switch-2-Closed count | >=8.00<br><br><br><br><= 0.08* 8.00<br><br><br><br>>=0.80* 8.00 | Not Fault Active<br><br>Controller is on<br><br>Park button switch signals:<br><br>Vehicle Speed<br><br>Comprehensive correlation diagnostics: | P07B3, P07B4, P07B5, P07B9, P07BA, P07BB<br><br>>~100 ms<br><br>=valid<br><br><= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .<br><br>=True* | This is based on the number of button and switch activation, not time.<br><br>*note: these samples can accumulate over key-cycles | Type B, 2 Trips |
| | | | 1] The number of Park button Press<br><br>AND<br><br>Switch-1-Closed count<br><br>AND<br><br>Switch-2-Closed count | >=8.00<br><br><br><br>>= 0.80* 8.00<br><br><br><br><=0.08* 8.00 | Not Fault Active<br><br>Controller is on<br><br>Park button switch signals:<br><br>Vehicle Speed<br><br>Comprehensive correlation diagnostics: | P07B3, P07B4, P07B5, P07B9, P07BA, P07BB<br><br>>~100 ms<br><br>=valid<br><br><= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .<br><br>=True* | This is based on the number of button and switch activation, not time.<br><br>*note: these samples can accumulate over key-cycles | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Camshaft Actuator Solenoid Circuit Low-Bank 1 | P2088 | Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 0.5 Q impedance between signal and controller ground | Diagnostic is Enabled<br><br>System supply voltage<br><br>Output driver is commanded on<br><br>Ignition switch is in crank or run position | > 11.00 Volts | 20 failures out of 25 samples<br><br>250 ms /sample, continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intake Camshaft Actuator Solenoid Circuit High - Bank 1 | P2089 | Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 0.5 Q impedance between signal and controller power | Diagnostic is Enabled<br><br>System supply voltage<br><br>Output driver is commanded on<br><br>Ignition switch is in crank or run position | > 11.00 Volts | 20 failures out of 25 samples<br><br>250 ms /sample, continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Post Catalyst Fuel Trim System Too Lean Bank 1 | P2096 | Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2096 will set.<br><br>The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset.<br><br>Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral | The Average Integral Offset % Authority<br><br>AND<br><br>The Average Total Offset % Authority<br><br>(Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria)<br><br>High Vapor Feature:<br>The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18%for>= 5.0 seconds AND the % Authority metric is approaching the failure threshold.<br><br>Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14%for>= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary. | >= 97.5 %<br><br>>= 70.0 %<br><br>If the P2096 is actively failing then the Average Integral Offset must be < 95.0 % and the Average Total Offset must be < 65.0 % for the diagnostic to report a pass. | The post cat fuel trim diagnostic is enabled<br><br>The diagnostic is enabled during:<br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration<br><br>Ambient Air Pressure<br>Engine AirFlow<br>Intake Manifold Pressure<br>Induction Air Temperature<br>Start-up Coolant Temp.<br><br>PTO<br>Intrusive diag. fuel control<br>Ethanol Estimation in Progress<br><br>02 Heater Learned Resistance<br><br>Long Term Secondary Fuel Trim Enabled for (see **"Long Term Secondary Fuel Trim Enable Criteria"** in Supporting Tables)<br><br>High Vapor Conditions<br><br>Green Cat System | <br><br>No<br>No<br>Yes<br>Yes<br>Yes<br><br>>= 70 kPa<br>>= 0.0 g/s<= 10,000.0<br>>= 0 kPa <= 256<br>-20 deg. C 200<br>>= -20 deg. C (or OBD Coolant Enable Criteria = TRUE)<br><br>Not Active<br>Not Active<br>Not Active<br><br>= Valid<br>( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )<br><br>>= 0.1 seconds<br><br>Not Present<br><br>= Not Valid, | Frequency: Continuous Monitoring in 100ms loop.<br><br>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensorthat is within its optimal operating range (neither rich nor lean). | | | Condition<br><br>----------<br>Delay during GPF Regeneration<br><br>If the diagnostic delays during a GPF Regen, it will continue to delay following completion of the Regen until the following number of samples have been accumulated. (1 sample = 100ms):<br><br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration<br><br>----------<br><br>No Fault Active for: | Green Cat System condition is considered valid until the accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22grams/sec.<br>----------<br><br>No Delay<br><br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br><br>----------<br><br>AmbientAirDefault<br>AIR System FA<br>Ethanol Composition Sensor FA<br>ECT_Sensor_FA<br>EGRValveCircuit_FA<br>EGRValvePerformance_FA<br>IAT_SensorFA_ | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CamSensorAnyLocationFA<br>EvapEmissionSyste m_FA<br>EvapFlowDuringNonPurge_FA<br>FuelTankPressureSnsrCkt_FA<br>EvapPurgeSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapVentSolenoidCircuit_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>MAF_SensorTFTKO<br>MAP_SensorFA<br>MAP_EngineVacuumStatus<br>EngineMisfireDetected_FA<br>A/F Imbalance Bankl<br>O2S_Bank_1_Sensor_1_FA<br>O2S_Bank_1_Sensor_2_FA | | |
| | | | | | For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms):<br><br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration | <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>300<br>300<br>0<br>200<br>300 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell). | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Post Catalyst Fuel Trim System Too Rich Bank 1 | P2097 | Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2097 will set.<br><br>The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset.<br><br>Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral | The Average Integral Offset % Authority<br><br>AND<br><br>The Average Total Offset % Authority<br><br>(Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria)<br><br>High Vapor Feature:<br>The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18%for>= 5.0 seconds.<br><br>Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14%for>= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary. | <= -97.5 %<br><br><= -70.0 %<br><br>If the P2097 is actively failing then the Average Integral Offset must be > -95.0 % and the Average Total Offset must be > -65.0% for the diagnostic to report a pass. | Same as P2096 | Same as P2096 | Frequency: Continuous Monitoring in 100ms loop.<br><br>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensorthat is within its optimal operating range (neither rich nor lean). | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Post Catalyst Fuel Trim System Too Lean Bank 2 | P2098 | Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2098 will set.<br><br>The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset.<br><br>Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral | The Average Integral Offset % Authority<br><br>AND<br><br>The Average Total Offset % Authority<br><br>(Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria)<br><br>High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18%for>= 5.0 seconds AND the % Authority metric is approaching the failure threshold.<br><br>Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14%for>= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary. | >= 97.5%<br><br>>= 70.0%<br><br>If the P2098 is actively failing then the Average Integral Offset must be < 95.0 % and the Average Total Offset must be < 65.0 % for the diagnostic to report a pass. | The post cat fuel trim diagnostic is enabled<br><br>The diagnostic is enabled during:<br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration<br><br>Ambient Air Pressure<br>Engine AirFlow<br>Intake Manifold Pressure<br>Induction Air Temperature<br>Start-up Coolant Temp.<br><br>PTO<br>Intrusive diag. fuel control<br>Ethanol Estimation in Progress<br><br>02 Heater Learned Resistance<br><br>Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables)<br><br>High Vapor Conditions<br><br>Green Cat System | No<br>No<br>Yes<br>Yes<br>Yes<br><br>>= 70 kPa<br>>= 0.0 g/s<= 10,000.0<br>>= 0 kPa <= 256<br>-20 deg. C 200<br>>= -20 deg. C (or OBD Coolant Enable Criteria = TRUE)<br><br>Not Active<br>Not Active<br>Not Active<br><br>= Valid<br>( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )<br><br>>= 0.1 seconds<br><br>Not Present<br><br>= Not Valid, | Frequency: Continuous Monitoring in 100ms loop.<br><br>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensorthat is within its optimal operating range (neither rich nor lean). | | | Condition<br><br>----------<br>Delay during GPF Regeneration<br><br>If the diagnostic delays during a GPF Regen, it will continue to delay following completion of the Regen until the following number of samples have been accumulated. (1 sample = 100ms):<br><br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration<br><br>----------<br><br>No Fault Active for: | Green Cat System condition is considered valid until the accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22grams/sec.<br>----------<br>No Delay<br><br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br><br>----------<br>AmbientAirDefault<br>AIR System FA<br>Ethanol Composition Sensor FA<br>ECT_Sensor_FA<br>EGRValveCircuit_FA<br>EGRValvePerformance_FA<br>IAT_SensorFA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CamSensorAnyLocationFA<br>EvapEmissionSyste m_FA<br>EvapFlowDuringNonPurge_FA<br>FuelTankPressureSnsrCkt_FA<br>EvapPurgeSolenoidCircuit_FA<br>EvapSmallLeak_FA<br>EvapVentSolenoidCircuit_FA<br>FuelInjectorCircuit_FA<br>MAF_SensorFA<br>MAF_SensorTFTKO<br>MAP_SensorFA<br>MAP_EngineVacuumStatus<br>EngineMisfireDetected_FA<br>A/F Imbalance Bank2<br>O2S_Bank_2_Sensor_1_FA<br>O2S_Bank_2_Sensor_2_FA | | |
| | | | | | For the cells identified as enabled (i.e. those containing a "Yes" above), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms):<br><br>Deceleration<br>Idle<br>Cruise<br>Light Acceleration<br>Heavy Acceleration | 300<br>300<br>0<br>200<br>300 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell). | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Post Catalyst Fuel Trim System Too Rich Bank 2 | P2099 | Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2099 will set.<br><br>The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset.<br><br>Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral | The Average Integral Offset % Authority<br><br>AND<br><br>The Average Total Offset % Authority<br><br>(Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria)<br><br>High Vapor Feature:<br>The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18%for>= 5.0 seconds.<br><br>Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14%for>= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary. | >= -97.5 %<br>.<br><br>>= -70.0 %<br><br>If the P2099 is actively failing then the Average Integral Offset must be < -95.0 % and the Average Total Offset must be < -65.0 % for the diagnostic to report a pass. | Same as P2098 | Same as P2098 | Frequency: Continuous Monitoring in 100ms loop.<br><br>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensorthat is within its optimal operating range (neither rich nor lean). | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Throttle Actuator Position Performance | P2101 | 1) Detect a throttle positioning error. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the voltage is high enough and there is not a voltage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle control is driving the throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active. | Difference between measured throttle position and modeled position, (modeled = MAX (Commanded vs. Commanded Filtered)) ><br><br>OR<br><br>Difference between modeled position (modeled = MIN (Commanded vs. Commanded Filtered)) and measured throttle position > | 8.06 %<br><br>8.06 % | TPS minimum learn is not active<br><br>AND<br><br>Powertrain Relay Contactl Fault is FALSE (no P1682 fault)<br><br>AND<br><br>Throttle Control is not in Service or DVT control<br>AND<br><br>Throttle is being Controlled<br><br>AND<br><br>( (Engine Running AND Run/Crank Voltage)<br>OR<br>Run Crank Voltage)<br><br>AND<br><br>( PT Relay Command On<br>OR<br>( (Engine Running AND Powertrain Relay Voltage)<br>OR<br>Powertrain Relay Voltage) )<br><br>AND<br><br>((Engine shutdown procedure is not complete)<br>OR<br>(Run/Crank signal is | > 5.50 Volts<br><br>>8.41 Volts<br><br>> 5.50 Volts<br><br>>8.41 Volts | 15 counts;<br><br>12.5 ms/count in the primary processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | active)) | | | |
| | | | Throttle Position > | 36.00% | TPS minimum learn active AND<br><br>Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND<br><br>Throttle Control is not in Service or DVT control | = TRUE | 11 counts;<br><br>12.5 ms/count in the primary processor | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Throttle Return to Default Performance | P2119 | Throttle unable to return to default throttle position after de-energizing ETC motor. | (Normalized TPS1 percent Vref > AND Normalized TPS2 percent Vref> On the main processor)<br><br>OR<br><br>(Normalized TPS1 percent Vref < AND Normalized TPS2 percent Vref< On the main processor)<br><br>(100% corresponds to 5.0 Volt) | 1.7560 % Vref<br><br>1.7590 % Vref<br><br>1.4340 % Vref<br><br>1.4310% Vref | Throttle de-energized due to one of the following conditions:<br><br>Powerup Default Learn<br>OR<br>Default Throttle Authority<br>OR<br>PT Relay Voltage<br>OR<br>Main System Shutdown<br>OR<br>Battery Saver Active<br>OR<br>(Powertrain Relay On<br>AND<br>Run/Crank Active) | <br><br><br>= TRUE<br><br>= TRUE<br><br>< 5.500 Volts<br><br>= TRUE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE | 0.4969 s if ETC motor command is STOP (when Default Throttle Authority or Main System Shutdown is causing Throttle de-energize)<br><br>5.0000 s if ETC motor command is not STOP | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Accelerator Pedal Position (APP) Sensor 1 Lo | P2122 | Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor. | APP1 percent Vref <<br><br>(100% corresponds to 5.0 Volt) | 9.25 %Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 19/39 counts; or<br><br>14 counts continuous;<br><br>12.5 ms/count in the main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Accelerator Pedal Position (APP) Sensor 1 Hi | P2123 | Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor. | APP1 percent Vref ><br><br>(100% corresponds to 5.0 Volt) | 95.00 % Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P06A3 | 19/39 counts; or<br><br>14 counts continuous;<br><br>12.5 ms/count in the main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Accelerator Pedal Position (APP) Sensor 2 Lo | P2127 | Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor. | APP2 percent Vref <<br><br>(100% corresponds to 5.0 Volt) | 6.50% Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P0697 | 19/39 counts; or<br><br>14 counts continuous;<br><br>12.5 ms/count in the main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Accelerator Pedal Position (APP) Sensor 2 Hi | P2128 | Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor. | APP2 percent Vref ><br><br>(100% corresponds to 5.0 Volt) | 52.00% Vref | Run/Crank voltage<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>P0697 | 19/39 counts; or<br><br>14 counts continuous;<br><br>12.5 ms/count in the main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Throttle Position (TP) Sensor 1-2 Correlation | P2135 | Detect a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between TPS1 and the TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic monitors the difference in reference voltage between normalized min TPS1 and the normalized min TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor | Difference between TPS1 displaced and TPS2 displaced > | 6.797%offset at min. throttle position with a linear threshold to 9.720% at max. throttle position | Run/Crank voltage<br><br>No TPS sensor faults<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>(P0122, P0123, P0222, P0223)<br><br>P06A3 | 79/159 counts; or<br><br>58 counts continuous;<br><br>3.125 ms/count in the main processor | Type A, 1 Trips |
| | | | Difference between (normalized min TPS1 ) and (normalized min TPS2) ><br><br>(100% corresponds to 5.0 Volt) | 5.000% Vref | Run/Crank voltage<br><br>No TPS sensor faults<br><br>No 5V reference error or fault for # 4 5V reference circuit | >6.41 Volts<br><br>(P0122, P0123, P0222, P0223)<br><br>P06A3 | 79/159 counts; or<br><br>58 counts continuous;<br><br>3.125 ms/count in the main processor | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Accelerator Pedal Position (APP) Sensor 1-2 Correlation | P2138 | Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor | Difference between APP1 displaced and APP2 displaced ><br><br>(100% corresponds to 5.0 Volt) | 5.000% offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position | Run/Crank voltage<br><br>No APP sensor faults<br><br>No 5V reference errors or faulstfor#3& #4 5V reference circuits | >6.41 Volts<br><br>(P2122, P2123.P2127, P2128)<br><br>(P06A3, P0697) | 19/39 counts intermittent; or<br><br>15 counts continuous,<br><br>12.5 ms/count in the main processor | Type A, 1 Trips |
| | | | Difference between (normalized min APP1 ) and (normalized min APP2) ><br><br>(100% corresponds to 5.0 Volt) | 3.500% Vref | Run/Crank voltage<br><br>No APP sensor faults<br><br>No 5V reference errors or faulstfor#3& #4 5V reference circuits | >6.41 Volts<br><br>(P2122, P2123.P2127, P2128)<br><br>(P06A3, P0697) | 19/39 counts intermittent; or<br><br>15 counts continuous,<br><br>12.5 ms/count in the main processor | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 high side circuit shorted to ground | P2147 | Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 1 high side circuit shorted to power | P2148 | Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 high side circuit shorted to ground | P2150 | Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 2 high side circuit shorted to power | P2151 | Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <br><br><br><br><br><br><br><= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 high side circuit shorted to ground | P2153 | Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector3 high side circuit shorted to power | P2154 | Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 high side circuit shorted to ground | P2156 | Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 4 high side circuit shorted to power | P2157 | Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Vehicle Speed - Output Shaft Speed Correlation | P215B | Detect invalid vehicle speed source. This failure is set by two different conditions. Either the absolute difference between wheel speed vehicle speed and TOS vehicle speed is too high, or secure vehicle speed is not available. | The absolute difference between wheel speed vehicle speed and TOS vehicle speed greater than ><br><br>OR<br><br>Secure vehicle speed source is unavailable | 6.21 mph | | Time since first CAN activity > 0.5000 s<br><br>Secure vehicle speed source is TOS vehicle speed or wheel speed vehicle speed<br><br>Trans engaged state is equal to engaged. | 400/800 counts for wheel speed correlation<br><br>or<br><br>400/ 800 counts for TOS correlation; 25ms/count | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 high side circuit shorted to ground | P216B | Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector5 high side circuit shorted to power | P216C | Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 high side circuit shorted to ground | P216E | Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 6 high side circuit shorted to power | P216F | Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Minimum Throttle Position Not Learned | P2176 | Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position sensors were not in the minmum learn window after multiple attempts to learn the minimum. | During TPS min learn on the Main processor, TPS percent Vref ><br><br>AND<br><br>Number of learn attempts ><br><br>(100% corresponds to 5.0 Volt) | 11.48% Vref<br><br>10 counts | Run/Crank voltage<br><br>TPS minimum learn is active<br><br>No previous TPS min learn values stored in long term memory | > 6.41 Volts<br><br>= TRUE | 2.0 secs | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 high side circuit shorted to ground | P217B | Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector 7 high side circuit shorted to power | P217C | Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 high side circuit shorted to ground | P217E | Controller specific output driver circuit diagnoses Injector 8 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | 25 amp >= through High Side Driver | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector8 high side circuit shorted to power | P217F | Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 1 volt between signal and controller power | Battery Voltage<br>Engine Run Time | >=11 Volts<br>>=0 Seconds<br><br>P062B notFAorTFTK | 10.00 failures out of 20.00 samples<br><br>100 ms /sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Bank 1 Air-Fuel Ratio Imbalance | P219A | This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on Bank 1. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without).<br><br>The observed Variance is dependent on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric.<br><br>The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table | Standard Mode Filtered Ratio<br><br>The EWMA calculation uses the weighting coefficient from the following supporting table: **P219A EWMA Coefficient**<br><br>For this program, the Optional Mode is NOT used<br><br>Optional Mode Filtered Ratio<br><br>The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode: | >0.35<br><br>If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.<br><br>> 0.50<br><br>If the diagnostic has reported a failure on the prior trip, the Optional Mode Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing. | The A/F imbalance diagnostic is enabled<br><br>System Voltage<br><br>Fuel Level<br><br>Engine Coolant Temperature<br><br>Cumulative engine run time<br><br>Diagnostic enabled at Idle (regardless of other operating conditions)<br><br>Engine speed range<br><br>Engine speed delta during a short term sample period<br><br>Mass Airflow (MAF) range<br><br>Cumulative delta MAF during a short term sample period<br><br>Filtered MAF delta between samples<br>Note: first order lag filter coefficient applied to MAF | No lower than 10.0 Volts for more than 0.2 seconds<br><br>> 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty.<br><br>>-20 deg. C(orOBD Coolant Enable Criteria = TRUE)<br><br>> 0.0 seconds<br><br>No<br><br>1,130 to 3,550 RPM<br><br><50 RPM<br><br>5 to 1,000 g/s<br><br><5 g/s<br><br><0.70 g/s | Minimum of 1 test per trip, up to 8 tests per trip during RSR or FIR.<br><br>The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 15.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | **P219A Variance Threshold Bankl Table** ) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17x17 table (see Supporting Table **P219A Normalizer Bankl Table ).** This quotient is then multiplied by a quality factor calibration from a 17x17 table (see Supporting Table **P219A Quality Factor Bankl Table )** . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.<br><br>Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result Jn a positive Filtered ___ | **P219A EWMA Coefficient Opt Table** | | = 0.050<br><br>Air Per Cylinder (APC)<br><br>APC delta during short term sample period<br><br>Filtered APC delta between samples<br>Note: first order lag filter coefficient applied to APC = 0.050<br><br>Spark Advance<br><br>Throttle Area (percent of max)<br><br>Intake Cam Phaser Angle<br><br>Exhaust Cam Phaser Angle<br>----------<br>Electronic Waste Gate (eWG) present<br><br>If eWG = yes then Waste Gate Position<br><br>Intrusive eWG Feature<br><br>If intrusive Waste Gate positin is enabled then the electronic Waste Gate will be commanded to the following range when the other enable conditions have been met.<br><br>Intrusive Waste Gate Position Min | 140 to 620 mg/cylinder<br><br><90mg/cylinder<br><br><5.00 percent<br><br>5 to 55 degrees<br><br>0 to 200 percent<br><br>0 to 25 degrees<br><br>0 to 25 degrees<br>----------<br>No<br><br>0.0 to 100.0<br><br>Disabled<br><br>0.0 | made within 5 minutes of operation.<br><br>ForRSRorFIR, 16 tests must complete before the diagnostic can report. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Ratio.<br><br>The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific.<br><br>Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use his feature.<br><br>For programs using Active Fuel Management or Multiple Cam profiles, a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following suooortinq | | | Intrusive Waste Gate Position Max<br>----------<br><br>Delay during GPF Regeneration<br><br>----------<br><br>Active Fuel Management Firing Fraction<br><br>if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations<br><br>Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response<br><br>If the intrusive Firing Fraction feature is enabled the Active Fuel Management firing fraction will be forced to a value above this threshold when in Fast Initial Response or in Rapid Step Response.<br>----------<br><br>For programs using multi-step cam profiles:<br><br>High Lift Cam Profile will use: | 101.0<br>----------<br><br>No Delay<br><br>----------<br><br>0.99 to 1.10<br><br>0.99 to 0.01<br><br>Disabled<br><br>>=0.99<br><br>----------<br><br>Standard Mode Filtered Ratio | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | tables:<br>**P219A Variance Threshold Bankl Opt Table** ,<br>**P219A Normalizer Bankl Opt Table ,**<br>and<br>**P219A Quality Factor Bankl Opt Table** | | | Low Lift Cam Profile will use:<br><br>Quality Factor (QF)<br>QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table **P219A Quality Factor Bankl Table ).** QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data.<br><br>Fuel Control Status Closed Loop and Long Term FT Enabled for:<br><br>Device Control<br>AIR pump<br>CASE learn<br>EGR<br>EVAP<br>Engine Over Speed Protection<br>Idle speed control<br>PTO<br>Injector base pulse width | Standard Mode Filtered Ratio<br><br>>=0.99<br><br>>= 1.2 seconds (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables)<br><br>Not active<br>Not on<br>Not active<br>Not intrusive<br>Not intrusive<br>Not Active<br><br>Normal<br>Not Active<br>Above min pulse limit | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | 02 learned htr resistance | = Valid (the 02 heater resistance has learned since NVM reset) | | |
| | | | | | Rapid Step Response (RSR):<br>RSR will trigger if the Ratio result from the last test is<br>AND it exceeds the last Filtered ratio by<br><br>Once triggered, the filtered ratio is reset to: | >= 0.35<br><br>>=2.00<br><br>0.00 | | |
| | | | | | Fast Initial Response (FIR):<br>FIR will trigger when an NVM reset or code clear occurs.<br>Once triggered, the filtered ratio is reset to: | -0.80 | | |
| | | | | | No Fault Active for: | MAP_SensorFA<br>MAF_SensorFA<br>ECT_Sensor_FA<br>TPS_ThrottleAuthorityDefaulted<br>FuelInjectorCircuit_FA<br>AIR System FA<br>EvapExcessPurgePsbl_FA<br>CamSensorAnyLocationFA<br>FuelTrimSystemB1_FA<br>O2S_Bank_1_Sensor_1_FA<br>O2S_Bank_1_Sensor_2_FA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | WRAF_Bank_1_FA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Bank 2 Air-Fuel Ratio Imbalance | P219B | This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 2. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without).<br><br>The observed Variance is dependant on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric.<br><br>The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table | Standard Mode Filtered Ratio<br><br>The EWMA calculation uses the weighting coefficient from the following supporting table: **P219B EWMA Coefficient**<br><br>Optional Mode Filtered Ratio<br><br>For this program the Optional Mode is NOT used<br><br>The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode: **P219B EWMA Coefficient Opt Mode** | > 0.25<br><br>If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.15 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.<br><br>> 0.50<br><br>If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing | The A/F imbalance diagnostic is enabled<br><br>System Voltage<br><br>Fuel Level<br><br>Engine Coolant Temperature<br><br>Cumulative engine run time<br><br>Diagnostic enabled at Idle (regardless of other operating conditions)<br><br>Engine speed range<br><br>Engine speed delta during a short term sample period<br><br>Mass Airflow (MAF) range<br><br>Cumulative delta MAF during a short term sample period<br><br>Filtered MAF delta between samples<br><br>Note: first order lag filter coefficient applied to MAF = 0.050 | No lower than 10.0 Volts for more than 0.2 seconds<br><br>> 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty.<br><br>>-20 deg. C(orOBD Coolant Enable Criteria = TRUE)<br><br>> 0.0 seconds<br><br>No<br><br>1,130 to 3,550 RPM<br><br><50RPM<br><br>5 to 1,000g/s<br><br><5g/s<br><br><0.70g/s | Minimum of 1 test per trip, up to 9 tests per trip during RSR or FIR.<br>The front 02 sensor voltage is sampled once per cylinder event.<br>Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 15.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above.<br>Generally, a report will be made within 5 | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | **P219B Variance Threshold Bank2 Table** ) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17x17 table (see Supporting Table **P219B Normalizer Bank2 Table )** This quotient is then multiplied by a quality factor calibration from a 17x17 table (see Supporting Table **P219B Quality Factor Bank2 Table )** . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.<br><br>Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result Jn a positive Filtered ___ | | | Air Per Cylinder (APC)<br><br>APC delta during short term sample period<br><br>Filtered APC delta between samples<br>Note: first order lag filter coefficient applied to APC = 0.050<br><br>Spark Advance<br><br>Throttle Area (percent of max)<br><br>Intake Cam Phaser Angle<br><br>Exhaust Cam Phaser Angle<br><br>----------<br>Electronic Waste Gate (eWG) present<br><br>If eWG = yes then<br><br>Waste Gate Position<br><br>Intrusive eWG Feature<br><br>If intrusive Waste Gate positin is enabled then the electronic Waste Gate will be commanded to the following range when the other enable conditions have been met.<br><br>Intrusive Waste Gate | 140 to 620 mg/cylinder<br><br><90mg/cylinder<br><br>< 5.00 percent<br><br>5 to 55 degrees<br><br>0 to 200 percent<br><br>0 to 25 degrees<br><br>0 to 25 degrees<br><br>----------<br>No<br><br>0.0 to 100.0<br><br>Disabled<br><br>0.0 | minutes of operation.<br><br>ForRSRorFIR, 18 tests must complete before the diagnostic can report.See P219Ainfo | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Ratio.<br><br>The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific.<br><br>Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.<br><br>For programs using Active Fuel Management or Multiple Cam profiles a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following suooortinq | | | Position Min<br><br>Intrusive Waste Gate Position Max<br>----------<br>Delay during GPF Regeneration<br><br>----------<br><br>Active Fuel Management Firing Fraction<br><br>if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations<br><br>Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response<br><br>If the intrusive Firing Fraction feature is enabled the Active Fuel Management firing fraction will be forced to a value above this threshold when in Fast Initial Response or in Rapid Step Response.<br><br>----------<br><br>For programs using multi-step cam profiles:<br><br>High Lift Cam Profile will use: | 101.0<br><br>----------<br>No Delay<br><br>----------<br><br>0.99 to 1.10<br><br>0.99 to 0.01<br><br>Disabled<br><br>>=0.99<br><br>----------<br><br>Standard Mode Filtered Ratio | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | tables:<br>**P219B Variance Threshold Bank2 Opt Table**<br>,<br>**P219B Normalizer Bank2 Opt Table ,**<br>and<br>**P219B Quality Factor Bank2 Table** | | | Low Lift Cam Profile will use:<br><br>Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table **P219B Quality Factor Bank2 Table ).** QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data.<br><br>Fuel Control Status Closed Loop and Long Term FT Enabled for:<br><br>Device Control<br>AIR pump<br>CASE learn<br>EGR<br>EVAP<br>Engine Over Speed Protection<br>Idle speed control<br>PTO<br><br>Injector base pulse width<br><br>02 learned htr resistance | Standard Mode Filtered Ratio<br><br>>=0.99<br><br>>= 1.2 seconds (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria" in Supporting Tables)<br><br>Not active<br>Not on<br>Not active<br>Not intrusive<br>Not intrusive<br>Not Active<br><br>Normal<br>Not Active<br><br>Above min pulse limit<br><br>= Valid (the 02 heater resistance has learned | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | since NVM reset) | | |
| | | | | | Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is | >= 0.25 | | |
| | | | | | AND it exceeds the last Filtered ratio by | >=1.35 | | |
| | | | | | Once triggered, the filtered ratio is reset to: | 0.00 | | |
| | | | | | Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: | -0.50 | | |
| | | | | | No Fault Active for: | MAP_SensorFA<br>MAF_SensorFA<br>ECT_Sensor_FA<br>TPS_ThrottleAuthorityDefaulted<br>FuelInjectorCircuit_FA<br>AIR System FA<br>EvapExcessPurgePsbl_FA<br>CamSensorAnyLocationFA<br>FuelTrimSystemB2_FA<br>O2S_Bank_2_Sensor_1_FA<br>O2S_Bank_2_Sensor_2_FA<br>WRAF_Bank_2_FA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure (BARO) Sensor Circuit Low (applications with LIN MAF) | P2228 | Detects an eroneously low value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too low.<br><br>The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | BARO Pressure | < 50.0 kPa | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 160 failures out of 200 samples<br><br>1 sample every 25 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure (BARO) Sensor Circuit High (applications with LIN MAF) | P2229 | Detects an eroneously high value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too high.<br><br>The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | BARO Pressure | > 115.0 kPa | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 160 failures out of 200 samples<br><br>1 sample every 25 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure (BARO) Sensor Circuit Intermittent (applications with LIN MAF) | P2230 | Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected.<br><br>When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”.<br><br>Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current BARO reading - BARO reading from 25 milliseconds previous) | > 100 kPa<br><br>40 consecutive BARO readings | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Circuit/Open Bank 1 Sensor 1 (For use with WRAF& Gen IV ECM | P2237 | This DTC determines if theB1S1 WRAF 02 Sensor Pump Current signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is < 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>This application uses the following type of WRAF sensor:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9<br><br>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | The ASIC provides a fault indication when the pumping current circuit fails the following criteria;<br><br>Based on the type of WRAF sensor used;<br><br>CeWRSG_e_Bosch_LSU_4p9<br><br>element resistance > 400 ohms<br><br>pump cell reference resistance > Nernst reference resistance<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Performance Bank 1 (For use with WRAF - non E80 | P223C | This DTC determines if the WRAF 02 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO.<br><br>The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters. | Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO. | The three pump current fault regions are:<br>A) Pump current >5.00 ma<br><br>B) Pump current < 0.30 ma and > -0.30 ma<br><br>C) Pump current < -0.10ma<br><br>The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>**********<br><br>Test starts when time in DFCO<br><br>Test stops when time in DFCO | WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds<br><br>**DFCO Active Minimum > Time (seconds)** in the Supporting Tables<br><br>> **DFCO Active Maximum Time (seconds)** in the Supporting Tables | Region A: 128 failures out of 160 samples<br><br>OR<br><br>Region B: 128 failures out of 160 samples<br><br>OR<br><br>Region C: 128 failures out of 160 samples<br><br>Sample rate is 25 msec.<br><br>Test enabled during DFCO. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Performance Bank 2 (For use with WRAF - non E80 | P223D | This DTC determines if the WRAF 02 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO.<br><br>The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters. | Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO.<br><br>Note: This ASIC is referred to as ATIC142 (Continental). | The three pump current fault regions are:<br>A) Pump current >5.00 ma<br><br>B) Pump current < 0.30 ma and > -0.30 ma<br><br>C) Pump current < -0.10ma<br><br>The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>**********<br><br>Test starts when time in DFCO<br><br>Test stops when time in DFCO | WRAF_Bank_2_FA<br>P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds<br><br>**DFCO Active Minimum > Time (seconds)** in the Supporting Tables<br><br>> **DFCO Active Maximum Time (seconds)** in the Supporting Tables | Region A: 128 failures out of 160 samples<br><br>OR<br><br>Region B: 128 failures out of 160 samples<br><br>OR<br><br>Region C: 128 failures out of 160 samples<br><br>Sample rate is 25 msec.<br><br>Test enabled during DFCO. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Resistance Out Of Range Bank 1 | P223E | This DTC determines if the WRAF 02 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications.<br><br>The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters. | Measured Reference cell temperature | < 700 Deg C<br>OR<br>>1,000.0 Deg C | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay<br>Then<br>Delay after WRAF circuit<br>*y so tfeA l y******** | <br><br>WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 128 failures out of 160 samples<br><br>Sample rate is 25 msec<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Resistance Out Of Range Bank 2 | P223F | This DTC determines if the WRAF 02 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications.<br><br>The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters. | Measured Reference cell temperature | < 700 Deg C<br>OR<br>>1,000.0 Deg C | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay<br>Then<br>Delay after WRAF circuit<br>*y so tfeA l y******** | <br><br>WRAF_Bank_2_FA<br>P0155, P0050, P0051 or P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 128 failures out of 160 samples<br><br>Sample rate is 25 msec<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Circuit/Open Bank 2 Sensor 1 (For use with WRAF& Gen IV ECM | P2240 | This DTC determines if the B2S1 WRAF 02 Sensor Pump Current signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B2S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is < 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_2_FA<br>P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |
| | | | B2S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>This application uses the following type of WRAF sensor:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9 | The ASIC provides a fault indication when the pumping current circuit fails the following criteria;<br><br>Based on the type of WRAF sensor used;<br><br>CeWRSG_e_Bosch_LSU_4p9<br><br>element resistance > 400 ohms<br><br>pump cell reference resistance > Nernst | DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_2_FA<br>P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | reference resistance<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1 (For use with WRAF& Gen IV ECM | P2243 | This DTC determines if theB1S1 WRAF 02 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is > 1.2V and pump cell voltage is < 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_1_FA P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |
| | | | B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | The ASIC provides a fault indication when the reference voltage circuit fails the following criteria;<br><br>\|Nernst signal - 0.45\| >1.0 volts<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_1_FA P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1 (For use with WRAF& Gen IV ECM | P2247 | This DTC determines if the B2S1 WRAF 02 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B2S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is > 1.2V and pump cell voltage is < 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_2_FA P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |
| | | | B2S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | The ASIC provides a fault indication when the reference voltage circuit fails the following criteria;<br><br>\|Nernst signal - 0.45\| >1.0 volts<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_2_FA P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Ground Circuit/Open Bank 1 Sensor 1 (For use with WRAF& Gen IV ECM | P2251 | This DTC determines if theB1S1 WRAF 02 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B1S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br><u>Note:</u> This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is > 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | B1S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | The ASIC provides a fault indication when the reference ground circuit fails the following criteria;<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | WRAF_Bank_1_FA<br>P0135, P0030, P0031, P0032<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Reference Ground Circuit/Open Bank 2 Sensor 1 (For use with WRAF& Gen IV ECM | P2254 | This DTC determines if the B2S1 WRAF 02 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).<br><br>The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters. | B2S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>Note: This ASIC is referred to as ATIC142 (Continental). | The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is > 1.2V<br><br>Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_2_FA<br>P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | B2S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal.<br><br>Open fail counts are accumulated to determine fault status.<br><br>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | The ASIC provides a fault indication when the reference ground circuit fails the following criteria;<br><br>CJ136 H/W detection<br><br>Note: the faults must exist for more than 10 msec to qualify for a fail flag. | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Measure Valid status (ASIC)<br><br>Controller status (ASIC)<br><br>Engine Run or Auto stop<br>**********<br><br>Heater Warm-up delay Then<br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br>********** | <br><br>WRAF_Bank_2_FA P0155, P0050, P0051, P0052<br><br>= Valid<br><br>= Ready<br><br>= True<br><br>= Complete<br><br>> 20.0 seconds | 20 failures out of 24 samples<br><br>Continuous in 25 milli - second loop | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Signal Stuck Lean Bank 1 Sensor 2 | P2270 | The P2270 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached. | Post 02 sensor signal<br><br>AND<br><br>The Accumulated mass airflow monitored during the Stuck Lean Voltage Test | < 845mvolts<br><br>> 80 grams | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuelInjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>02S_Bank_ 1_TFTK0<br>02S_Bank_ 2_TFTK0<br><br>P013A, P013B, P013E, P013F, P2270 or P2271<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Pedal position | < 2.0% | | |
| | | | | | Engine Airflow | 4.0 < gps < 20.0 | | |
| | | | | | Closed loop integral | 0.75 < C/L Int < 1.08 | | |
| | | | | | Closed Loop Active | = TRUE (Please see **"Closed Loop Enable Clarification"** in Supporting Tables). | | |
| | | | | | Evap | not in control of purge | | |
| | | | | | Ethanol Estimation in Progress | = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | Crankshaft Torque | <125.0Nm | | |
| | | | | | EGR Intrusive diagnostic | = not active | | |
| | | | | | All post sensor heater delays | = not active | | |
| | | | | | O2S Heater (post sensor) on Time | > 60.0 sec | | |
| | | | | | Transmission Temp | > -40.0 °C | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Predicted Catalyst temp<br>Fuel State<br><br>==========<br>All of the above met for at least 0.0 seconds, and then check the following<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled)<br>==========<br>All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.<br>==========<br>During Stuck Lean test the following must stay TRUE or the test will abort:<br>Commanded Fuel<br>Crankshaft Torque | 550 < °C < 850<br>= DFCO possible<br><br>==========<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7<br><br>0.95 < EQR < 1.10<br><125.0Nm | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Signal Stuck Rich Bank 1 Sensor 2 | P2271 | The P2271 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached. | Post 02 sensor signal<br><br>AND<br><br>The Accumulated mass airflow monitored during the Stuck Rich Voltage Test | > 100 mvolts<br><br>>25.0 grams | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B1S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuelInjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>02S_Bank_ 1_TFTKO<br>02S_Bank_ 2_TFTKO<br><br>P013A, P013B, P013E, P013For P2270<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tablestab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition<br>Only when<br>FuelLevelDataFault<br><br>Fuel State<br><br>DTC's Passed<br><br>==========<br>After above conditions are met: DFCO mode is continued (w/o driver initiated pedal input). | = False<br><br>= False<br><br>= DFCO possible<br><br>= P2270<br>= P013E<br>= P013A<br><br>========== | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Signal Stuck Lean Bank 2 Sensor 2 | P2272 | The P2272 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached. | Post 02 sensor signal<br><br>AND<br><br>The Accumulated mass airflow monitored during the Stuck Lean Voltage Test | < 845 mvolts<br><br>> 80 grams. | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>02S_Bank_ 1_TFTK0<br>02S_Bank_ 2_TFTK0<br><br>P013C, P013D, P014A, P014B, P2272 or P2273<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition | = False | | |
| | | | | | Only when FuelLevelDataFault | = False | | |
| | | | | | Pedal position | < 2.0% | | |
| | | | | | Engine Airflow | 4.0 < gps < 20.0 | | |
| | | | | | Closed loop integral | 0.75 < C/L Int < 1.08 | | |
| | | | | | Closed Loop Active | = TRUE (Please see **"Closed Loop Enable Clarification"** in Supporting Tables). | | |
| | | | | | Evap | not in control of purge | | |
| | | | | | Ethanol Estimation in Progress | = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). | | |
| | | | | | Post fuel cell | = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. | | |
| | | | | | Crankshaft Torque | <125.0Nm | | |
| | | | | | EGR Intrusive diagnostic | = not active | | |
| | | | | | All post sensor heater delays | = not active | | |
| | | | | | O2S Heater (post sensor) on Time | >= 60.0 sec | | |
| | | | | | Transmission Temp | > -40.0 °C | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Predicted Catalyst temp<br>Fuel State<br><br>==========<br>All of the above met for at least 0.0 seconds, and then check the following<br><br>Engine Speed to initially enable test<br>Engine Speed range to keep test enabled (after initially enabled)<br><br>Vehicle Speed to initially enable test<br>Vehicle Speed range to keep test enabled (after initially enabled)<br><br>==========<br>All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.<br>==========<br>During Stuck Lean test the following must stay TRUE or the test will abort:<br>Commanded Fuel<br>Crankshaft Torque | 550 < °C < 850<br>= DFCO possible<br><br>==========<br><br>950 < RPM < 2,500<br><br>925 < RPM < 2,550<br><br>39.8 < MPH < 74.6<br><br>37.3 < MPH < 77.7<br><br>0.95 < EQR < 1.10<br><125.0Nm | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Signal Stuck Rich Bank 2 Sensor 2 | P2273 | The P2273 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.<br><br>This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached. | Post 02 sensor signal<br><br>AND<br><br>The Accumulated mass airflow monitored during the Stuck Rich Voltage Test | > 100 mvolts<br><br>>25.0 grams. | Diagnostic is Enabled<br><br>No Active DTCs<br><br>B2S2 DTCs Not Active this key cycle<br><br>System Voltage<br>Learned heater resistance<br><br>Green 02S Condition | TPS_ThrottleAuthorityDefaulted<br>ECT_Sensor_FA<br>IAT_SensorFA<br>MAF_SensorFA<br>MAP_SensorFA<br>AIR System FA<br>FuellnjectorCircuit_FA<br>FuelTrimSystemB1_FA<br>FuelTrimSystemB2_FA<br>EngineMisfireDetected_FA<br>Ethanol Composition Sensor FA<br>02S_Bank_ 1_TFTKO<br>02S_Bank_ 2_TFTKO<br><br>P013C, P013D, P014A, P014B or P2272<br><br>>10.5 Volts<br>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" )<br><br>= Not Valid,<br>Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. | Frequency: Once per trip<br>Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. | | |
| | | | | | Low Fuel Condition Only when FuelLevelDataFault | = False<br><br>= False | | |
| | | | | | Fuel State<br>DTC's Passed | = DFCO possible<br>= P2272<br>= P014A<br>= P013C | | |
| | | | | | ==========<br>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input). | ========== | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure Sensor C Circuit Low | P227C | Detects an eroneously low value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too low.<br><br>The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | BARO C Pressure | < 50.0 kPa | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 160 failures out of 200 samples<br><br>1 sample every 25 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure Sensor C Circuit High | P227D | Detects an eroneously high value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too high.<br><br>The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol. | BARO C Pressure | > 115.0 kPa | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 160 failures out of 200 samples<br><br>1 sample every 25 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Barometric Pressure Sensor C Circuit Intermittent/ Erratic | P227E | Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected.<br><br>When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”.<br><br>Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high. | String Length<br><br>Where:<br>"String Length" = sum of "Diff" calculated over<br><br>And where:<br>"Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous) | > 100 kPa<br><br>40 consecutive BARO C readings | Diagnostic is Enabled<br><br>LIN communications established with MAF | | 4 failures out of 5 samples<br><br>Each sample takes 1.0 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SIDI High Pressure Pump Performance | P228C | This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events. | Fuel Pressure Error (Desired Pressure - Measure Pressure) | >=<br>**P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low**<br>Mpa<br>(see supporting tables) | High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECTNot FAand<br>Low side Fuel Pump Relay ckt Not FAand<br>Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and | True<br><br>>=11 Volts<br><br>> 0.180 MPa<br><br>Enabled when a code clear is not active or not exiting device control<br>Engine is not cranking | Positive Pressure Error-<br><br>10.00 second failures out of 12.50 second samples | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Engine movement detected is true and Manufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active<br><br>Barometric Pressure<br>Inlet Air Temp<br>Fuel Temp | <br><br><br><br><br><br><br>>=70.0 KPA<br>>=-20.0 degC<br>-12<=Temp degC <= 132 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SIDI High Pressure Pump Performance | P228D | This DTC determines if the high pressure pump is delivering high pressure that desired pressure. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events. | Fuel Pressure Error (Desired Pressure - Measure Pressure) | <= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables) | High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) and<br>Cam or Crank Sensor Not FA and<br>IAT,IAT2,ECTNot FAand<br>Low side Fuel Pump Relay ckt Not FAand<br>Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement | True<br><br>>=11 Volts<br><br>>0.180 MPa<br><br>Enabled when a code clear is not active or not exiting device control<br>Engine is not cranking | Negative Pressure Error-<br><br>10.00 second failures out of 12.50 second samples | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | detected is true<br>andManufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active<br><br>Barometric Pressure<br>Inlet Air Temp<br>Fuel Temp | <br><br><br><br><br><br>>= 70.0 KPA<br>>= -20.0 DegC<br>-12 <= TempdegC <= 132 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #1 CIRCUIT LOW | P2300 | Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | >11.0 | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #1 CIRCUIT High | P2301 | Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #2 CIRCUIT Low | P2303 | Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #2 CIRCUIT High | P2304 | Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #3 CIRCUIT Low | P2306 | Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #3 CIRCUIT High | P2307 | Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #4 CIRCUIT Low | P2309 | Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller ground | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #4 CIRCUIT High | P2310 | Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #5 CIRCUIT Low | P2312 | Diagnoses Cylinder #5 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #5 CIRCUIT High | P2313 | Diagnoses Cylinder #5 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #6 CIRCUIT Low | P2315 | Diagnoses Cylinder #6 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #6 CIRCUIT High | P2316 | Diagnoses Cylinder #6 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #7 CIRCUIT Low | P2318 | Diagnoses Cylinder #7 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #7 CIRCUIT High | P2319 | Diagnoses Cylinder #7 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #8 CIRCUIT Low | P2321 | Diagnoses Cylinder #8 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| IGNITION CONTROL #8 CIRCUIT High | P2322 | Diagnoses Cylinder #8 Ignition Control (E8T) output driver circuit for a Short to Power fault | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | < 100 Q impedance between signal and controller power | Engine running<br><br>Ignition Voltage | > 11.0 Volts | 50 Failures out of 63 Samples<br><br>100 msec rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Switch Run/ Start Position Circuit Low | P2534 | Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the ECM run/ crank is active. | Ignition switch Run/Start position circuit low | Run / Crank = FALSE | Ignition switch Run/Start position circuit low diag enable<br><br>and<br><br>Run / Crank active ECM | = 1.00<br><br><br><br><br>= TRUE | 106 failures out of 132 samples<br><br>25 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Switch Run/ Start Position Circuit High | P2535 | Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the ECM run/ crank is NOT active. | Ignition switch Run/Start position circuit high | Run/ Crank = TRUE | Ignition switch Run/Start position circuit low diag enable<br><br>and<br><br>Run / Crank active ECM | = 1.00<br><br><br><br><br>= FALSE | 320 failures out of400 samples<br><br>25 ms /sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Control Torque Request Circuit | P2544 | Determines if the torque request from the TCM is valid | Protect error - Serial Communication message 2's complement not equal ($189/$199) | Message <> two's complement of message | Diagnostic Status | Enabled | >=16 failures out of 20 samples. | Type B, 2 Trips |
| | | | | | Power Mode | = Run | Performed on every received message | |
| | | | OR<br>Rolling count error - Serial Communication message ($189/$199) rolling count index value | Message <> previous message rolling count value + one | Ignition Voltage | > 6.41 volts | >= 6 Rolling count errors out of 10 samples. | |
| | | | | | Engine Running | = True | Performed on every received message | |
| | | | OR | | Run/Crank Active | > 0.50 Sec | >=6 range errors out of 10 samples. | |
| | | | Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase | > 600 Nm | No Serial communication loss to TCM (U0101) | No loss of communication | Performed on every received message | |
| | | | OR | | | | | |
| | | | Multi-transition error - Trans torque intervention type request change | Requested torque intervention type toggles from not increasing request to increasing request | | | >=5 multi-transitions out of 5 samples. Performed every 200 msec | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Hood Switch Performance | P257D | This DTC monitors the hood switch rationality | Hood Switch position is in an invalid position. The hood switch reading is invalid in these ranges.<br><br>Hood Switch Type: CeVIOS_e_GlobalB<br><br>If Hood Switch type is CeVIOS_e_GlobalA<br><br>If Hood Switch type is CeVIOS_e_GlobalB | <br><br><br><br><br><br><br>43.4% to 45.7%<br><br>59.34% to 66.96% | The diagnostic is enabled<br><br>Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable | Enabled<br><br>Use Run/Crank as Enable | 80 failed samples within 100 total samples<br><br>Diagnostic runs in the 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Hood Switch Short to Ground / Low Voltage | P257E | This DTC monitors the hood switch for a short to ground or low voltage condition | Hood Switch position reading is lower than an expected bounds for<br><br>The hood switch reading is lower than expected bounds at:<br><br>Hood Switch Type: CeVIOS_e_GlobalB<br><br>If Hood Switch type is CeVIOS_e_GlobalA<br><br>If Hood Switch type is CeVIOS_e_GlobalB | <br><br><br><br><br><br><br><br>< 17.2%<br><br>< 28.54% | The diagnostic is enabled<br><br>Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable | Enabled<br><br>Use Run/Crank as Enable | 80 failed samples within 100 total samples<br><br>Diagnostic runs in the 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Hood Switch Short to Voltage / High Voltage | P257F | This DTC monitors the hood switch for a short to voltage or high voltage condition | Hood Switch position reading is higher than an expected bounds for<br><br>The hood switch reading is higher than expected bounds at:<br><br>Hood Switch Type: CeVIOS_e_GlobalB<br><br>If Hood Switch type is CeVIOS_e_GlobalA<br><br>If Hood Switch type is CeVIOS_e_GlobalB | <br><br><br><br><br><br><br><br>> 67.8%<br><br>> 85.2% | The diagnostic is enabled<br><br>Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable | Enabled<br><br>Use Run/Crank as Enable | 80 failed samples within 100 total samples<br><br>Diagnostic runs in the 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Pump “A” Control Circuit Stuck On | P261F | The purpose of the diagnostic is to detect and report a failure of the component. This diagnostic checks the commanded off state of the pump to ensure that it is not reporting an actual speed that would represent a commanded on state. If the enable criteria are met when the pump is commanded off, the actual speed is evaluated. If the actual speed is greater than the calibrated fault threshold, the diagnostic reports a FAIL. If the actual speed does not exceed the calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met. | Pump Feedback Speed | >= 3,100.00 RPM | Diagnostic is Enabled<br><br>12V System Voltage<br><br>PECR_AuxCoolPmpSpdActl_Fol<br>PECR_AuxCoolPmpSpdActl_Av<br><br>Any of the following criteria are met for<br><br>a) Pump Enable<br><br>b) Pump Command Speed in Range | <br><br>> 11.00 V (with hysteresis disable <10.00 V)<br><br>= Not Active<br><br>= Not Active<br><br>>= 3.00 s<br><br>True<br><br>0.00 RPM to 299.00 RPM | 8 seconds out of a 10 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Trim Circuit/Open Bank 1 Sensor 1 (For use with WRAF& E81 or GenIV ECM | P2626 | This DTC determines if the WRAF O2S trim circuit is open. The trim circuit fine tunes the WRAF O2S pump current signal. The diagnostic is an Application-Specific Integrated Circuit (ASIC) intrusive test which runs when the Run/Crank signal changes from False to True.<br><br>The diagnostic failure counter is incremented if the ASIC test fails and the enable conditions are met. This DTC is set based on the fail and sample counters. | B1S1 Trim circuit Open test.<br><br>This application uses the following type of WRAF sensor:<br><br>The ASIC Open trim test detects a fault if the trim circuit resistance is:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9<br><br>Note: This ASIC is referred to as ATIC142 (Continental). | CeWRSG_e_Bosch_LSU_4p9<br><br>> 4,644 ohms<br><br>> 379.5 ohms | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Run/Crank Signal<br><br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br><br>Fuel Control State<br><br>Off Stoich Closed Loop<br><br>DFCO<br><br>WRAF Pump current | WRAF_Bank_1_FA P0135, P0030, P0031, P0032<br><br>changes from false to true<br><br>> 20.0 seconds<br><br>= Closed Loop<br><br>= Not active<br><br>= Not active<br><br>< 1.0 ma | 1 fail counts out of 1 samples<br><br>25 ms /sample<br><br>Continuous | Type B, 2 Trips |
| | | | B1S1 Trim circuit Open test.<br><br>This application uses the following type of WRAF sensor:<br><br>The ASIC Open trim test detects a fault if the trim circuit resistance is:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9 | CeWRSG_e_Bosch_LSU_4p9<br><br>< 118ohms or > 4K ohms<br><br><30 ohms or >300 ohms | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Run/Crank Signal<br><br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br><br>Fuel Control State<br><br>Off Stoich Closed Loop<br><br>DFCO | WRAF_Bank_1_FA P0135, P0030, P0031, P0032<br><br>changes from false to true<br><br>> 20.0 seconds<br><br>= Closed Loop<br><br>= Not active<br><br>= Not active | 1 fail counts out of 1 samples<br><br>25 ms /sample<br><br>Continuous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch). | AND<br><br>Pump current circuit not detected open | WRAF Pump current | < 1.0 ma | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| 02 Sensor Pumping Current Trim Circuit/Open Bank 2 Sensor 1 (For use with WRAF& E81 or GenIV ECM | P2629 | This DTC determines if the WRAF 02S trim circuit is open. The trim circuit fine tunes the WRAF02S pump current signal. The diagnostic is an Application-Specific Integrated Circuit (ASIC) intrusive test which runs when the Run/Crank signal changes from False to True.<br><br>The diagnostic failure counter is incremented if the ASIC test fails and the enable conditions are met. This DTC is set based on the fail and sample counters. | B2S1 Trim circuit Open test.<br><br>This application uses the following type of WRAF sensor:<br><br>The ASIC Open trim test detects a fault if the trim circuit resistance is:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9<br><br>Note: This ASIC is referred to as ATIC142 (Continental). | CeWRSG_e_Bosch_LSU_4p9<br><br>> 4,644 ohms<br><br>> 379.5 ohms | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Run/Crank Signal<br><br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br><br>Fuel Control State<br><br>Off Stoich Closed Loop<br><br>DFCO<br><br>WRAF Pump current | WRAF_Bank_2_FA P0155, P0050, P0051, P0052<br><br>changes from false to true<br><br>> 20.0 seconds<br><br>= Closed Loop<br><br>= Not active<br><br>= Not active<br><br>< 1.0 ma | 1 fail counts out of 1 samples<br><br>25 ms /sample<br><br>Continuous | Type B, 2 Trips |
| | | | B2S1 Trim circuit Open test.<br><br>This application uses the following type of WRAF sensor:<br><br>The ASIC Open trim test detects a fault if the trim circuit resistance is:<br><br>For NGK_ZFAS_U2<br><br>For Bosch_LSU_4p9<br><br>Note: This ASIC is | CeWRSG_e_Bosch_LSU_4p9<br><br>< 118ohms or > 4K ohms<br><br><30 ohms or >300 ohms<br><br>AND<br><br>Pump current circuit | Diagnostic is Enabled<br><br>DTC's Not active this key cycle<br><br>Run/Crank Signal<br><br>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)<br><br>Fuel Control State<br><br>Off Stoich Closed Loop<br><br>DFCO<br><br>WRAF Pump current | WRAF_Bank_2_FA P0155, P0050, P0051, P0052<br><br>changes from false to true<br><br>> 20.0 seconds<br><br>= Closed Loop<br><br>= Not active<br><br>= Not active<br><br>< 1.0 ma | 1 fail counts out of 1 samples<br><br>25 ms /sample<br><br>Continuous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | referred to as CJ136 (next Gen version of CJ135 from Bosch). | not detected open | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Power Off Timer Performance | P262B | This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test(RaTe).<br><br>Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.<br><br>Range Test(RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active. | Count Up Test:<br><br>Time difference between the current read and the previous read of the timer<br><br>Range Test:<br><br>The variation of the HWIO timer and mirror timer is | > 1.50 seconds<br><br>> 0.25%. | | | Count Up Test: 8 failures out of 40 samples<br><br>1 sec / sample<br><br>Continuous while run/crank is not active and until controller shutdown is initiated.<br><br>Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Drive Pinion Circuit Open (12VSS) | P26E4 | Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | >= 200 KOhms impedance between signal and controller ground. | Starter relay pinion diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>= 11.00 volts | 40 failures out of 50 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Drive Pinion Circuit Low Voltage (12VSS) | P26E5 | Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | <= 0.5 Ohms impedance between signal and controller ground | Starter control diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>= 6.41 volts | 8 failures out of 10 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Starter Relay Drive Pinion Circuit High Voltage (12VSS) | P26E6 | Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | <= 0.5 Ohms impedance between signal and controller power | Starter control diag enable<br><br>Engine speed<br><br>Run Crank voltage | Enabled<br><br>>=0.00RPM<br><br>>= 11.00 volts | 40 failures out of 50 samples<br><br>50 ms /sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio | P279A | Monitor measured transfer case gear ratio is 4WD low ratio or neutral while the transfer case control module command state is4WDhigh. The4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors. | transfer case contol module transfer case command state<br><br>AND<br><br>measured transfer case ratio is in 4WD low ratio window<br>OR<br>measured transfer case ratio is in neutral window<br><br>AND<br><br>measured transfer case ratio is in 4WD low ratio window<br><br>(measured transfer case ratio = transmission output speed / transfer case output speed)<br><br>update rate 12.5 milliseconds | = 4WD high<br><br>4WD low ratio window<br>< 3.00<br>> 2.40<br><br>neutral ratio window<br>< 1.20<br>> 0.80<br>OR<br>< 2.90<br>> 2.50<br><br>4WD low ratio window<br>< 2.90<br>> 2.50 | transmssion gear is forward gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>transmssion gear is reverse gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>diagnsotic monitor enable<br>PTO active<br>engine power limited<br><br>DTCs not fault active | > 500.0 RPM<br>> 80.0 Nm<br>> 300.0 RPM<br>> 5.0 %<br><100.0 %<br><br>> 500.0 RPM<br>> 80.0 Nm<br>> 300.0 PRM<br>> 5.0 %<br>< 100.0 %<br><br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>P057B, P057C, P057D, P057E<br>P17D4, P279B, P279C<br>P0502, P0503, P0722, P0723, P2160, P2161 | fail counts > 560.00 counts<br><br>out of sample counts > 800.00 counts<br><br>update rate 12.5 milliseconds for 1 count | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio | P279B | Monitor measures transfer case gear ratio is 4WD high ratio or neutral while the transfer case control module command state is4WDIow. The4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors. | transfer case contol module transfer case command state<br><br>AND<br><br>measured transfer case ratio is in 4WD high ratio window<br>OR<br>measured transfer case ratio is in neutral window<br><br>AND<br><br>measured transfer case ratio is in 4WD high ratio window<br><br>(measured transfer case ratio = transmission output speed / transfer case output speed)<br><br>update rate 12.5 milliseconds | = 4WD low<br><br>4WD high ratio window<br>< 1.30<br>> 0.70<br><br>neutral ratio window<br>< 1.20<br>> 0.80<br>OR<br>< 2.90<br>> 2.50<br><br>4WD high ratio window<br>< 1.20<br>> 0.80 | transmssion gear is forward gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>transmssion gear is reverse gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>diagnsotic monitor enable<br>PTO active<br>engine power limited<br><br>DTCs not fault active | > 500.0 RPM<br>> 80.0 Nm<br>> 300.0 RPM<br>> 5.0 %<br>< 100.0 %<br><br>> 500.00 RPM<br>> 80.0 Nm<br>> 300.0 PRM<br>> 5.0 %<br>< 100.0 %<br><br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>P057B, P057C, P057D, P057E<br>P17D4, P279A, P279C<br>P0502, P0503, P0722, P0723, P2160, P2161 | fail count > 560.00 counts out of sample count >800.00 counts<br><br>update rate 12.5 milliseconds for 1 count | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio | P279C | Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors. | transfer case contol module transfer case command state<br><br>AND<br><br>measured transfer case ratio is in 4WD low ratio window<br>OR<br>measured transfer case ratio is in 4WD high window<br><br>AND<br><br>measured transfer case ratio is in 4WD low ratio window or in 4WD high ratio window<br><br>(measured transfer case ratio = transmission output speed / transfer case output speed)<br><br>update rate 12.5 milliseconds | = 4WD neutral<br><br>4WD low ratio window<br>< 3.00<br>> 2.40<br><br>4WD high ratio window<br>> 1.30<br>< 0.70<br><br>4WD neutral ratio window<br>< 2.90<br>> 2.50<br>OR<br>< 1.20<br>> 0.80 | transmssion gear is forward gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>transmssion gear is reverse gear:<br>transmission output shaft speed<br>engine torque<br>engine speed<br>accelerator pedal position<br>brake pedal position<br><br>diagnsotic monitor enable<br><br>PTO active<br>engine power limited<br><br>DTCs not fault active | > 300.0 RPM<br>> -20.0 Nm<br>> 0.0 RPM<br>> 0.0 %<br>< 100.0 %<br><br>> 500.0 RPM<br>> 80.0 Nm<br>> 300.0 PRM<br>> 5.0 %<br>< 100.0 %<br><br>= 1 AND<br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>P057B, P057C, P057D, P057E<br>P17D4, P279A, P279B<br>P0502, P0503, P0722, P0723, P2160, P2161 | fail count> 840.00 counts out of sample count > 1,200.00 counts<br><br>update rate 12.5 milliseconds for 1 count | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Injection Pulse Performance | P2B00 | Diagnostic to determine if any of the commanded injection pulses for cylinder 1 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Injection Pulse Performance | P2B01 | Diagnostic to determine if any of the commanded injection pulses for cylinder 2 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Injection Pulse Performance | P2B02 | Diagnostic to determine if any of the commanded injection pulses for cylinder 3 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Injection Pulse Performance | P2B03 | Diagnostic to determine if any of the commanded injection pulses for cylinder 4 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Injection Pulse Performance | P2B04 | Diagnostic to determine if any of the commanded injection pulses for cylinder 5 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Injection Pulse Performance | P2B05 | Diagnostic to determine if any of the commanded injection pulses for cylinder 6 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Injection Pulse Performance | P2B06 | Diagnostic to determine if any of the commanded injection pulses for cylinder 7 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Injection Pulse Performance | P2B07 | Diagnostic to determine if any of the commanded injection pulses for cylinder 8 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 1 Injection Pulse Performance | P2B08 | Diagnostic to determine if any of the commanded injection pulses for cylinder 1 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 2 Injection Pulse Performance | P2B09 | Diagnostic to determine if any of the commanded injection pulses for cylinder 2 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 3 Injection Pulse Performance | P2B0A | Diagnostic to determine if any of the commanded injection pulses for cylinder 3 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 4 Injection Pulse Performance | P2B0B | Diagnostic to determine if any of the commanded injection pulses for cylinder 4 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 5 Injection Pulse Performance | P2B0C | Diagnostic to determine if any of the commanded injection pulses for cylinder 5 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 6 Injection Pulse Performance | P2B0D | Diagnostic to determine if any of the commanded injection pulses for cylinder 6 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinder 7 Injection Pulse Performance | P2B0E | Diagnostic to determine if any of the commanded injection pulses for cylinder 7 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Cylinders Injection Pulse Performance | P2B0F | Diagnostic to determine if any of the commanded injection pulses for cylinder 8 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude | =<<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) | = True<br><br>= True<br><br>= True | 50.00 to 100.00 samples<br><br>Continuous Cylinder event sample rate | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Pump "A" Overspeed | P2B86 | The purpose of the performance diagnostic is to detect and report a failure of the component. If the enable criteria are met, the difference between the commanded speed and the component actual speed is calculated. An overspeed condition is when the commanded speed is less than the component actual speed. The speed difference is filtered and when the difference is less than the overspeed calibrated fault threshold, the diagnostic reports a FAIL. If filtered speed difference does not exceed the overspeed calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met.<br><br>There are two different failure criteria as the pump feedback speed is dependent on the system voltage. | Any of the following fail criteria is met:<br><br>Criteria1:<br><br>Filtered (Pump Command Speed - Pump Feedback Speed)<br><br>12V System Voltage<br><br>Criteria 2:<br><br>Filtered (Pump Command Speed - Pump Feedback Speed)<br><br>12V System Voltage | <<br>**P2B86 Coolant Pump "A" Overspeed Fail Threshold**<br>(RPM)<br><br>>=12.00 V<br><br><<br>**P2B86 Coolant Pump "A" Overspeed Fail Threshold Low Volatage**<br>(RPM)<br><br><12.00 V<br><br>(See supporting tables for the above threshold values) | Diagnostic is Enabled<br><br>Difference in Pump Command Speed from previous data sample to present data sample<br><br>Any of the following criteria is met:<br><br>Criteria 1:<br><br>Calibration to use fault pending is TRUE<br><br>PECR_EAP_SpeedOORL_FP<br>PECR_EAP_SpeedOORH_FP<br><br>Criteria 2:<br><br>Calibration to use fault pending is FALSE<br>All of the following criteria is met<br><br>2a)<br><br>PECR_EAP_SpeedOORL_FA<br>PECR_EAP_SpeedOORL_TFTKO<br><br>2b)<br><br>PECR_EAP_SpeedOORH_FA<br>PECR_EAP_SpeedOORH-TFTKO | <50.00 RPM for >= 3.00 s<br><br>= 1.00(1 is TRUE)<br><br>= Not Active<br><br>= Not Active<br><br>= 1.00 (0 is FALSE)<br><br>= Not Active<br><br>= Not Active<br><br>= Not Active<br><br>= Not Active | 8 seconds out of a 10 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | All of the following criteria are met for Time Delay: (See "Time Delay- definition below) | | | |
| | | | | | 12V System Voltage | > 11.00 V (with hysteresis disable <10.00 V) | | |
| | | | | | PECR_AuxCoolPmpSpdActl_Fol | = Not Active | | |
| | | | | | PECR_AuxCoolPmpSpdActl_Av | = Not Active | | |
| | | | | | Pump Enable | = True | | |
| | | | | | Pump Command Speed in Range | 300.00 RPM <= Command Speed <= 3,480.00 RPM | | |
| | | | | | Any of the following criteria is met: | | | |
| | | | | | Criteria 1: Engine inlet coolant temperature check calibration is TRUE | = 0.00 (1 is TRUE) | | |
| | | | | | Criteria 2: a) EECR_EngineInlet_FA | = Not Fault Active | | |
| | | | | | b) Engine Inlet Coolant Temperature | >= -40.00 °C | | |
| | | | | | Where: "Time Delay" | >=2.00 s | | |
| | | | | | If all of the following criteria are met: | | | |
| | | | | | a) Engine inlet coolant temperature check _____ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | calibration is FALSE<br><br>b) Engine Inlet Coolant Temperature<br><br>Else "Time Delay" | = 0.00 (0 is FALSE)<br><br><=-30.00 degC<br><br>>= 1.00 s | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Pump "A" Underspeed | P2B87 | Detects when the coolant pump speed is slower than the commanded speed. | Any of the following fail criteria is met:<br><br>Criteria1:<br><br>Filtered (Pump Command Speed - Pump Feedback Speed)<br><br>12V System Voltage<br><br>Criteria 2:<br><br>Filtered (Pump Command Speed - Pump Feedback Speed)<br><br>12V System Voltage | <br><br><br><br>< **P2B87 Coolant Pump "A" Underspeed Fail Threshold** (RPM)<br><br>>=12.00 V<br><br><br><br>< **P2B87 Coolant Pump "A" Underspeed Fail Threshold Low Voltage** (RPM)<br><br><12.00 V<br><br>(See supporting tables for the above threshold values) | Diagnostic is Enabled<br><br>Difference in Pump Command Speed from previous data sample to present data sample<br><br>Any of the following criteria is met:<br><br>Criteria 1:<br><br>Calibration to use fault pending is TRUE<br><br>PECR_EAP_SpeedOORL_FP<br><br>PECR_EAP_SpeedOORH_FP<br><br>Criteria 2:<br><br>Calibration to use fault pending is FALSE<br><br>All of the following criteria is met<br><br>2a)<br>PECR_EAP_SpeedOORL_FA<br>PECR_EAP_SpeedOORL_TFTKO<br><br>2b)<br>PECR_EAP_SpeedOORH_FA<br>PECR_EAP_SpeedOORH-TFTKO | <br><br><50.00 RPM for >= 3.00 s<br><br><br><br>= 1.00(1 is TRUE)<br><br>= Not Active<br><br>= Not Active<br><br><br><br>= 1.00 (0 is FALSE)<br><br><br><br>= Not Active<br>= Not Active<br><br><br>= Not Active<br>= Not Active | 8 seconds out of a 10 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | All of the following criteria are met for Time Delay: (See "Time Delay- definition below) | | | |
| | | | | | 12V System Voltage | > 11.00 V (with hysteresis disable <10.00 V) | | |
| | | | | | PECR_AuxCoolPmpSpdActl_Fol | = Not Active | | |
| | | | | | PECR_AuxCoolPmpSpdActl_Av | = Not Active | | |
| | | | | | Pump Enable | = True | | |
| | | | | | Pump Command Speed in Range | 300.00 RPM <= Command Speed <= 3,480.00 RPM | | |
| | | | | | Any of the following criteria is met: | | | |
| | | | | | Criteria 1: Engine inlet coolant temperature check calibration is TRUE | = 0.00 (1 is TRUE) | | |
| | | | | | Criteria 2: a) EECR_EngineInlet_FA | = Not Fault Active | | |
| | | | | | b) Engine Inlet Coolant Temperature | >= -40.00 °C | | |
| | | | | | Where: "Time Delay" | >=2.00 s | | |
| | | | | | If all of the following criteria are met: | | | |
| | | | | | a) Engine inlet coolant temperature check _____ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | calibration is FALSE<br><br>b) Engine Inlet Coolant Temperature<br><br>Else "Time Delay" | = 0.00 (0 is FALSE)<br><br><— 30.00degC<br><br>>= 1.00 s | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cold Start Injection Pulse Performance | P2B95 | Monitors injector pulses when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that missed a pulse relative to the total number of pulses when multi pulse is active. | Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder | =<<br>**P2B96 - Opening Magnitude Misisng Pulse Fail Limit**<br><br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)<br><br>OBD Manufacturer Enable Counter<br><br>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:<br><br>Catalyst Temperature<br>AND<br>Engine Coolant<br>AND<br>Engine Coolant<br>AND<br>Barometric Pressure<br><br>In addition, Multi Pulse Strategy Is Enabled and Active Per the following:<br><br>Engine Speed<br><br>Accel Position<br><br>Engine Run Time | = True<br><br>= True<br><br>= 0<br><br>< 550.00 degC<br><br>> -12.00degC<br><br><= 66.00 degC<br><br>>= 70.00 KPa<br><br>>= 550.00 RPM<br><= 2,000.00 RPM<br><br><= 0.00 Pct<br><br>< 100 seconds | Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.<br><br>Frequency: 100ms<br><br>Test completes after Dual Pulse is no longer active<br>OR<br>The first 500 engine cycles have been reached | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: | | | |
| | | | | | Catalyst Temperature | >= 800.00 degC | | |
| | | | | | AND | | | |
| | | | | | Engine Run Time | >= 1.00 seconds | | |
| | | | | | OR | | | |
| | | | | | Engine Run Time | > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit**<br><br>This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. | | |
| | | | | | OR | | | |
| | | | | | Barometric Pressure | < 70.00 KPa | | |
| | | | | | Multi Pulse Strategy will exit per the following: | | | |
| | | | | | Engine Speed | > 2,350.00 RPM | | |
| | | | | | OR | | | |
| | | | | | Accel Position | > 3.00 Pct | | |
| | | | | | Engine Run Time | >= 100 seconds | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Mulit Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied: | | | |
| | | | | | "Additional Multi Pulse Enabling Criteria": | | | |
| | | | | | Green Engine Enrichment | Not Enabled | | |
| | | | | | Misfire Converter Protection strategy | Not being requested | | |
| | | | | | Engine Metal Overtemp strategy | Not being requested | | |
| | | | | | Fuel control state | Open Loop | | |
| | | | | | Output State Control | Not being requested for fuel | | |
| | | | | | DOD Or DFCO | Not Active | | |
| | | | | | Power Enrichment | Not Active | | |
| | | | | | Dynamic Power Enrichment | Not Active | | |
| | | | | | Piston Protection | Not Active | | |
| | | | | | Hot Coolant Enrichment | Not Active | | |
| | | | | | Injector Flow Test | Not Active | | |
| | | | | | General Enable | | | |
| | | | | | DTC's Not Set: | AcceleratorPedalFailure<br>ECT_Sensor_FA<br>IAT_SensorCircuitFA<br>MnfdTempSensorCktFA<br>CrankSensor_FA | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | FuelInjectorCircuit_FA<br>MAF_SensorFA<br>MAP_SensorFA<br>AnyCamPhaser_TFTKO<br>ClutchPstnSnsr FA<br>IAC_SystemRPM_FA<br>IgnitionOutputDriver_FA<br>TPS_FA<br>VehicleSpeedSensor_FA<br>FuelInjectorCircuit_TFTK0<br>FHPR_b_FRP_SnsrCkt_FA<br>FHPR_b_FRP_SnsrCkt_TFTKO<br>FHPR_b_PumpCkt_FA<br>FHPR_b_PumpCkt_TFTK0<br>TransmissionEngagedState_FA<br>EngineTorqueEstInaccurate<br>FuelPumpRlyCktFA | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injection Pulse Performance Global missing pulse diags | P2B96 | Diagnostic to determine if any of the commanded injection pulses for any of the cylinders was not delivered due to the injector pintle/armature not moving (total engine based). The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter. | Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder<br><br>Or<br><br>Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder | =<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit**<br>=><br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Misisng Pulse Fail Limit**<br>=<br>**P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Delta Misisng Pulse Fail Limit**<br>(See supporting table) | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)<br><br>Above Engine Temperature | = True<br><br>= True<br><br>>-30.000 | 100.00<br><br>Frequency: 100 ms<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module SIDI High Pressure Pump min/ max authority During Catalyst Warm Up | P2C1E | This DTC determines when the high pressure pump control has reached to its max or min authority during Cataylst Warm up | High Pressure Fuel Pump Delivery Angle<br><br>OR<br><br>High Pressure Fuel Pump Delivery Angle | >= 130°<br><br><= 0° | Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Barometric Pressure<br>Inlet Air Temp<br><br>Fuel Temp<br><br>Catalyst Warm up enabled<br>(See Definition in Supporting Material below)<br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) andCam or | True<br><br>>=11 Volts<br><br>> 0.180 MPa<br><br>Enabled when a code clear is not active or not exiting device control<br><br>Engine is not cranking<br><br>>= 70.0 KPA<br>>— -20.0 degC<br><br>-12 <= TempdegC <= 132<br><br>= True | Windup High/ Low<br><br>10.00 seconds failures out of 12.50 Seconds samples | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Crank Sensor Not FA and<br>IAT,IAT2,ECTNot FAand<br>Low side Fuel Pump Relay ckt Not FAand<br>Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement detected is true andManufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SIDI High Pressure Pump Performance During Catalyst Warm Up | P2C1F | This DTC determines if the high pressure pump is not able to maintain target pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events. | Fuel Pressure Error (Desired Pressure - Measure Pressure) | >=<br>**P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low**<br>Mpa<br>(see supporting tables) | Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Catalyst Warm up enabled<br>(See Definition in Supporting Material below)<br><br>Additional Enable Conditions:<br>All must be true<br>(High Pressure Pump is enabled and<br>High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and<br>High Pressure fuel pump ckt is Not (FA,FPor TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECTNot FAand Low side Fuel Pump Relay ckt Not FAand Estimate fuel rail pressure is valid and<br>Green Engine (In assembly plant) is not enabled and<br>Not if low fuel condition and<br>Low side Fuel Pump is on and<br>Injector Flow Test is not active and | True<br><br>>=11 Volts<br><br>> 0.180 MPa<br><br>= True<br><br>Enabled when a code clear is not active or not exiting device control Engine is not cranking | Positive Pressure Error-<br><br>10.00 second failures out of 12.50 second samples | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement detected is true and<br>Manufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active<br><br>Barometric Pressure<br>Inlet Air Temp<br>Fuel Temp | <br><br><br><br><br><br><br><br>>=70.0 KPA<br>>=-20.0 degC<br>-12<=Temp degC <= 132 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| SIDI High Pressure Pump Performance During Catalyst Warm Up | P2C20 | This DTC determines if the high pressure pump is delivering high pressure that desired pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events. | Fuel Pressure Error (Desired Pressure - Measure Pressure) | <= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables) | Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable<br><br>Battery Voltage<br><br>Low Side Fuel Pressure<br><br>Catalyst Warm up enabled (See Definition in Supporting Material below)<br><br>Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FPor TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECTNot FAand Low side Fuel Pump Relay ckt Not FAand Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not | True<br><br>>=11 Volts<br><br>>0.180 MPa<br><br>= True<br><br>Enabled when a code clear is not active or not exiting device control Engine is not cranking | Negative Pressure Error-<br><br>10.00 second failures out of 12.50 second samples | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | active and<br>Device control commanded pressure is false and<br>Device control pump ckt enabled on is false and<br>Engine movement detected is true andManufacturers enable counter is 0)<br>Flex Fuel Sensor Not FA<br>Ignition voltage out of correlation error(P1682) not active<br><br>Barometric Pressure<br>Inlet Air Temp<br>Fuel Temp | <br><br><br><br><br><br><br><br><br>>= 70.0 KPA<br>>= -20.0 DegC<br>-12 <= TempdegC <= 132 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 2 Underspeed Performance Fault [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P2CB9 | Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision. | Measured Fan Speed | <= Speed Low Limit [Supporting Table] **P2CB9_LIN_Threshold** | a] Diagnostic Enabled<br>b] Configuration calibration for number of fans<br>c] Diagnostic System Disabled<br>d] Battery Voltage In-Range<br>e] LIN Bus based Fan Operation Enabled<br>f] LIN Bus Lost Communication Fault Active<br>g] LIN Bus Continuous Operation Fault Active<br>h] Fan Commanded On | a] == 1.00 [True if 1; False ifO]<br>b] >= 1 unit<br>c] <>True<br>d] > 11.00 volts<br>e] == TRUE<br>f] <>True<br>g] <>True<br>i] == TRUE | 16.00 failures / 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Crank Control Circuit High Voltage | P305D | Diagnoses the DC/DC Converter Crank Control Circuit for circuit high faults | DC/DC Converter Crank Control | <> ECM Crank Control | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>ECM Crank Control<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>FALSE<br><br>>= 6.60 Volts | 320 failed samples out of 400 samples in 12.50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| DC/DC Converter Crank Control Circuit Low Voltage | P305E | Diagnoses the DC/DC Converter Crank Control Circuit for circuit low faults | DC/DC Converter Crank Control | <> ECM Crank Control | Diagnostic enabled<br><br>If Global B electrical architecture<br>Then<br>(Run/Crank or Accessory)<br>Else<br>(Sensor Bus Relay On<br>AND<br>Sensor Bus Relay Fault Active)<br><br>ECM Crank Control<br><br>Battery Voltage | 1<br><br>1<br><br><br>TRUE<br><br>TRUE<br><br>FALSE<br><br><br>TRUE<br><br>>= 6.60 Volts | 26 failed samples out of 30 samples in 12.50 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Pump "A" Speed Out of Range Low | P3077 | This diagnostic detects if the actual speed is out of range low. If the enable criteria are met and the actual speed is below a calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement criteria are met.Detects when the coolant pump speed is out of range low | Pump Feedback Speed | <= -10.00 RPM | Diagnostic is Enabled<br><br>All of the following criteria are met for<br><br>12V System Voltage<br><br>PECR_AuxCoolPmpSpdActl_Fol<br><br>PECR_AuxCoolPmpSpdActl_Av | <br><br><br>>= 1.00 s<br><br>> 11.00 V (with hysteresis disable <10.00 V)<br><br>= Not Active<br><br>= Not Active | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Coolant Pump "A" Speed Out of Range High | P3078 | This diagnostic detects if the actual speed is out of range high. If the enable criteria are met and the actual speed is above a calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement criteria are met. | Pump Feedback Speed | >= 4,001.00 RPM | Diagnostic is Enabled<br><br>All of the following criteria are met for<br><br>12V System Voltage<br><br>PECR_AuxCoolPmpSpdActl_Fol<br><br>PECR_AuxCoolPmpSpdActl_Av | <br><br><br>>= 1.00 s<br><br>> 11.00 V (with hysteresis disable <10.00 V)<br><br>= Not Active<br><br>= Not Active | 4 seconds out of a 5 seconds window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Injector Circuit Range/ Performance | P30D4 | Diagnostic to determine if any of the voltage feedback measured from the analog to digital converter on any cylinder is rational (total engine based). The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit. | Injector voltage feedback is not able to detect an opening magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Measured Voltage feedback converted to Injector Opening Magnitude<br><br>OR<br><br>Injector voltage feedback is not able to detect a closing time<br><br>OR<br><br>Measured Voltage feedback converted to Injector closing time<br><br>OR<br><br>Measured Voltage | =<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude**<br>(See supporting table)<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude**<br>(See supporting table)<br><br>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time**<br>(See supporting table)<br><br>>= | Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)<br><br>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)<br><br>Injection Pulse Width | = True<br><br>>=<br>**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width** | 1.25 Second Fail count out of 10.00 seconds Samples<br><br>Continuous | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | feedback converted to Injector closing time | **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table) | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 1 | P30D6 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts,<br><br>else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 2 | P30D7 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 3 | P30D8 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 4 | P30D9 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 5 | P30DA | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 6 | P30DB | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 7 | P30DC | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 8 | P30DD | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >=6.41 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 1 Out of Range Low [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P30EE | The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed | Measured LIN Fan1 Speed | < = -110.00 rpm | a] Diagnostic Enabled<br><br>b] Configuration calibration for number of fans<br><br>c] Diagnostic System Disabled<br><br>d] Battery Voltage In Range<br><br>e] LIN Bus based Fan Operation Enabled<br><br>f] LIN Serial data Lost communication Fault Active<br><br>g] LIN Serial data Continuous Operation Fault Active | a] ==1.00 [True if 1; False if 0]<br><br>b] >= 1 unit<br><br>c] <>True<br><br>d] > 11.00 volts<br><br>e] == TRUE<br><br>f] <>True<br><br>g] <>True | 16.00 failures out of 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 1 Out of Range High [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P30EF | The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed | Measured LIN Fan1 Speed | > = 4,000.00 rpm | a] Diagnostic Enabled<br><br>b] Configuration calibration for number of fans<br><br>c] Diagnostic System Disabled<br><br>d] Battery Voltage In Range<br><br>e] LIN Bus based Fan Operation Enabled<br><br>f] LIN Bus Lost Communication Fault Active<br><br>g] LIN Bus serial data Continuous Operation Fault Active | a] == 1.00 [True if 1; False if 0]<br><br>b] >= 1 unit<br><br>c] <>True<br><br>d] > 11.00 volts<br><br>e] == TRUE<br><br>f] <>True<br><br>g] <>True | 16.00 failures out of 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 2 Out of Range Low [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P30F0 | The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed | Measured LIN Fan2 Speed | < = -110.00 rpm | a] Diagnostic Enabled<br><br>b] Configuration calibration for number of fans<br><br>c] Diagnostic System Disabled<br><br>d] Battery Voltage In Range<br><br>e] LIN Bus based Fan Operation Enabled<br><br>f] LIN Serial data Lost communication Fault Active<br><br>g] LIN Serial data Continuous Operation Fault Active | a] ==1.00 [True if 1; False if 0]<br><br>b] >= 1 unit<br><br>c] <>True<br><br>d] > 11.00 volts<br><br>e] == TRUE<br><br>f] <>True<br><br>g] <>True | 16.00 failures out of 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 2 Out of Range High [LIN Bus Electric/ PWM Fans Only- Internal or External controller] | P30F1 | The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed | Measured LIN Fan2 Speed | > = 4,000.00 rpm | a] Diagnostic Enabled<br><br>b] Configuration calibration for number of fans<br><br>c] Diagnostic System Disabled<br><br>d] Battery Voltage In Range<br><br>e] LIN Bus based Fan Operation Enabled<br><br>f] LIN Bus Lost Communication Fault Active<br><br>g] LIN Bus serial data Continuous Operation Fault Active | a] == 1.00 [True if 1; False if 0]<br><br>b] >= 1 unit<br><br>c] <>True<br><br>d] > 11.00 volts<br><br>e] == TRUE<br><br>f] <>True<br><br>g] <>True | 16.00 failures out of 20.00 samples;<br><br>1000 ms/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P3105 | Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3401 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P3106 | Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P3108 | Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3409 may also set (Cylinder 2 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P3109 | Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P310B | Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3417 may also set (Cylinder 3 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P310C | Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P310E | Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3425 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P310F | Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.Diagnoses cylinder 4 deactivation solenoid control low side driver circuit for circuit faults | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P3111 | Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controller s P3433 may also set (Cylinder 5 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P3112 | Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P3114 | Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3441 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P3115 | Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P3117 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3449 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P3118 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Solenoid Valve High Control Circuit Low Voltage (DFMor AFM with Peak/Hold Drivers) | P311A | Controller specific output driver circuit diagnoses the Cylinder 8 Deactivation Solenoid high sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controller s P3457 may also set (Cylinder 8 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Solenoid Valve High Control Circuit High Voltage (DFMor AFM with Peak/Hold Drivers) | P311B | Controller specific output driver circuit diagnoses the Cylinder 8 Deactivation Solenoid high sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| P3186 (Internal Control Module Security Peripheral Performance ) | P3186 | This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable. | MAC verification has falsely passed a configurable number of times. | 3.00 | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Performance - Under Pressure | P3187 | This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision. | Sensed Filtered Fuel System [line] pressure error | > Threshold<br><br>[Supporting Table]<br>**P3187_Threshold** | a) Diagnostic is ..<br><br>b) Timer - Engine Running Minimum<br><br>c1) Fuel Flow Rate Valid<br><br>c2) Ambient Air Pressure Value Defaulted<br><br>c3) Fault bundle FDB_FuelPresSnsrCktFA<br><br>c4) Reference Voltage Fault Status [DTC P0641]<br><br>c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [DTC P20CD]<br><br>c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]<br><br>c7) Use Calculated Flow Performance Fault Thresholds<br><br>c8) Engine Speed Status Valid<br><br>c9) Fault bundle FAB_FuelPmpCktFA<br><br>c10) Fuel Control Enable Fault Active [DTC P12A6]<br><br>d 1) Fuel Pump Driver Module OverTemp Fault | a) Enabled<br><br>b) >= 30.00 seconds<br><br>c1)== TRUE<br><br>c2) == False<br><br>c3) == False<br><br>c4) == False<br><br>c5) == False<br><br>c6) == False<br><br>c7) == False<br><br>c8] ==TRUE<br><br>c9] == False<br><br>c10) == False<br><br>d 1)== False | 1 sample/ 12.5 millisec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Active [DTC P1255] | | | |
| | | | | | c12) Fuel Pump Speed Fault Active [DTCP129F] | c12) == False | | |
| | | | | | c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C] | c13) — False | | |
| | | | | | c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [DTC U18A7] | d 4] == False | | |
| | | | | | c15) Sensor Configuration [is Wired To FTZM?] | c15) == CeFDBR_e_WiredTo_FTZM | | |
| | | | | | c16) Sensor Bus Relay On | c 16) == TRUE | | |
| | | | | | d) Emissions Fuel Level Low [Message $3FB] | d) == False | | |
| | | | | | e) Fuel Control Enable | e) == TRUE | | |
| | | | | | f) Fuel Pump Control State | f) == normal | | |
| | | | | | g) Input circuit minimum voltage | g) >= 9.00 volts | | |
| | | | | | h) High Pres Fuel Pump Mode Management Active | h) == False | | |
| | | | | | j) High Pres Fuel Pump Control Mode | j) == Not Disabled Mode AND == Not ZeroFlow Mode | | |
| | | | | | ml) Fuel Pmp Speed Command Alive Rollina | ml) == False | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Count and Checksum Error [CAN Bus C $0CE] [DTC P14CD]<br><br>m2) CAN Sensor Bus message $0C3 Available<br><br>m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus C $0C3] [DTC U18A7]<br><br>n) Timer - Diagnostic Enable | <br><br><br>m2) == TRUE<br><br><br>m3) == False<br><br><br><br><br><br>n) > 2.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Pump Performance - Over Pressure | P3188 | This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision. | Sensed Filtered Fuel System [line] pressure error | <= Threshold [Supporting Table] **P3188_Threshold** | a) Diagnostic is .. | a) Enabled | 1 sample/ 12.5 millisec | Type B, 2 Trips |
| | | | | | b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D] | b1)== False | | |
| | | | | | b2) Sensor Configuration | b2) == CeFDBR_e_WiredTo_FTZM | | |
| | | | | | b3) Fuel Pres Sensor Serial Comm Ready | b3) == TRUE | | |
| | | | | | b4) Fuel Pres Sensor Serial Comm Fault Pending [DTC P14D5] | b4) == False | | |
| | | | | | b5) Sensed Fuel Control Enable Serial Comm Ready | b5) == TRUE | | |
| | | | | | b6) Sensed Fuel Control Enable Serial Comm Fault Pending | b6) == False | | |
| | | | | | c1) Fuel Flow data Valid | c1)== TRUE | | |
| | | | | | c2) Ambient Air Pressure Value Defaulted | c2) == False | | |
| | | | | | c3) Fuel Pres Sensor Type | c3) == CeFDBR_e_GaugePressure | | |
| | | | | | c4) Fault Bundle FDB_FuelPresSnsrCktFA | c4) == False | | |
| | | | | | c5) Reference Voltage | c5) == False | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Fault Status [DTC P0641] | | | |
| | | | | | c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] | c6) == False | | |
| | | | | | c7) Use Calculated Flow Performance Fault Thresholds | c7) == False | | |
| | | | | | c8) Engine Speed Status Valid | c8] ==TRUE | | |
| | | | | | c9) Fault bundle FAB_FuelPmpCktFA | c9] == False | | |
| | | | | | c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] | c10) == False | | |
| | | | | | d 1) Fuel Pump Speed Fault Active [DTCP129F] | d 1)== False | | |
| | | | | | c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3] | c12) == False | | |
| | | | | | c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C] | c13) — False | | |
| | | | | | c14) Fuel Pres Sensor Serial Comm Fault Active [DTCP14D5] | c14) == False | | |
| | | | | | c15) Sensor Bus Relay On | c 15) == TRUE | | |
| | | | | | d1) Timer-- Minimum Engine Running | d1)>= 30.00 seconds | | |
| | | | | | _d2) Diaanostic Data _____ | d2)== TRUE _____ | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Integrity OK<br><br>e) Fuel Control Enable<br><br>f) Fuel Pump Control State<br><br>g) Instantaneous Fuel Flow<br><br>h) Fuel Control Enable Fault Active [DTC P12A6]<br><br>j) Emissions Fuel Level Low [Message $3FB]<br><br>k) High Pres Fuel Pump Mode Management Enabled<br><br>l) High Pres Fuel Pump Control Mode<br><br>m) Diagnostic Data OK<br><br>n) Timer - Diagnostic Enable | e) == TRUE<br><br>f) == Normal<br><br>AND<br><br>== NOT Over Response Active<br><br>g) >= 0.05 gms /sec<br><br>h) == False<br><br>j) == False<br><br>k) == False<br><br>l) == NOT Disabled Mode AND<br>NOT Over Response Active Mode<br><br>m) == TRUE<br><br>n) > 2.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Trapped High Pressure Exhaust Charge | P3189 | When conditions are met, continuously monitors to diagnose if the cylinder 1 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Trapped High Pressure Exhaust Charge | P318A | When conditions are met, continuously monitors to diagnose if the cylinder 2 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Trapped High Pressure Exhaust Charge | P318B | When conditions are met, continuously monitors to diagnose if the cylinder 3 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Trapped High Pressure Exhaust Charge | P318C | When conditions are met, continuously monitors to diagnose if the cylinder 4 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Trapped High Pressure Exhaust Charge | P318D | When conditions are met, continuously monitors to diagnose if the cylinder 5 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Trapped High Pressure Exhaust Charge | P318E | When conditions are met, continuously monitors to diagnose if the cylinder 6 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Trapped High Pressure Exhaust Charge | P318F | When conditions are met, continuously monitors to diagnose if the cylinder 7 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Trapped High Pressure Exhaust Charge | P3190 | When conditions are met, continuously monitors to diagnose if the cylinder 8 exhaust valve fails to open to release the burned charge. The trapped charge will be re-compressed and produce high cylinder pressure as the piston rises to top dead center and potentially damage the intake mechanism during reactivation. Once a fault incidence is detected, the remedial action will be immediately taken to prevent engine hardware damage. This diagnostic monitors crank jerk to detect trapped exhaust charge. This diagnostic is subject to an X/Y maturity criteria. | Filtered crank jerk normalized by engine speed is greater than the threhold value when the cylinder of interest is deactivated | Filtered Crank Jerk > (A*APC$^{a}$2 + B*APC + C)*RPM<br><br>A = **HPESFailCoeffA**<br>B = **HPESFailCoeffB**<br>C = **HPESFailCoeffC** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP<br><br>Firing Fraction<br><br>Transmission Gear | Enabled<br><br>> 145.00 mg<br><br>> 25.00 (kPa/kPa)<br><br>< 0.95 (Active/Total)<br><br>> CeTGRR_e_TransGr2 | 66.00 failures out of 100.00 samples<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3401 | Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controller s P3403 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3403 | Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3401 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3404 | Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3409 | Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controlle rs P3411 may also set (Cylinder 2 Deactiva tion Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3411 | Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3409 may also set (Cylinder 2 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3412 | Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3417 | Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3419 may also set (Cylinder 3 Deactivation Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3419 | Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3417 may also set (Cylinder 3 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3420 | Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3425 | Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controller s P3427 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3427 | Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3425 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3428 | Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.Diagnoses cylinder 4 deactivation solenoid control low side driver circuit for circuit faults | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3433 | Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controller s P3435 may also set (Cylinder 5 Deactivation Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3435 | Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3433 may also set (Cylinder 5 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3436 | Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3441 | Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds | Voltage low during driver off state (indicates open circuit)Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit: > 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3443 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3443 | Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3441 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3444 | Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3449 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controlle rs P3451 may also set (Cylinder 7 Deactiva tion Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3451 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3449 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3452 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>>11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Solenoid Control Circuit/Open (DFMor AFM with Peak/Hold Drivers) | P3457 | Controller specific output driver circuit diagnoses the Cylinder 8 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. | Open Circuit:<br>> 200 k Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controlle rs P3459 may also set (Cylinder 8 Deactiva tion Solenoid Control Circuit/ Low) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Solenoid Control Circuit/Low (DFMor AFM with Peak/Hold Drivers) | P3459 | Controller specific output driver circuit diagnoses the Cylinder 8 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. | Voltage low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. | Short to Ground Circuit < 0.5 Q impedance between output and controller ground | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>>425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips<br><br>Note: In certain controllers P3457 may also set (Cylinder 8 Deactivation Solenoid Control Circuit/ Open) |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Solenoid Control Circuit/High (DFMor AFM with Peak/Hold Drivers) | P3460 | Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.<br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. | Short to Power<br>< 0.5 Q impedance between output and controller power | Diagnostic Enable<br><br>Powertrain Relay Voltage<br><br>Engine RPM | Enabled<br><br>> 11.00 volts<br><br>> 425.00 rpm | >= 20.00 errors out of 25.00 samples<br><br>Performed every 250 msec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 1 Deactivation Performance | P3498 | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 1 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 2 Deactivation Performance | P3499 | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 2 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 3 Deactivation Performance | P349A | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 3 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 4 Deactivation Performance | P349B | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 4 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 5 Deactivation Performance | P349C | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 5 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 6 Deactivation Performance | P349D | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 6 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinder 7 Deactivation Performance | P349E | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 7 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cylinders Deactivation Performance | P349F | When conditions are met, this diagnostic continuously monitors to detect valve-train deactivation system's failure to respond to cylinder 8 deactivation commands (both intake and exhaust valves remain activated), preventing the engine from achieving intended skip cycles. This diagnostic monitors filtered normalized Manifold Absolute Pressure (MAP) to detect when a cylinder exhaust valve failed to deactivate when requested. This diagnostic is subject to an X/Y maturity criteria. | Filtered MAP is greated than the threshold when the cylinder of interest is commanded to be deactivated. | Filtered MAP < **Deac MAP-CDC Threshold + F2Deac FF-CDC Threshold** | Diagnostic Enable<br><br>Filtered APC<br><br>Filtered MAP/BARO<br><br>Filltered MAP/BARO OR Firing Fraction<br><br>No Firing Fraction Change<br><br>Transmission Gear<br><br>Firing Fraction | Enabled<br><br>> 120.00 mg<br><br>>0.30 (kPa/kPa)<br><br><0.95 (kPa/kPa)<br><br>== 0 (Active/Total)<br><br>> CeTGRR_e_TransGr2<br><br><=0.95 (Active/Total | 22.00 failures out of 25.00 opportunities<br><br>Performed every 90 crank degree | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication Bus A Off | U0073 | This DTC monitors for a BUS A off condition | Bus off failures equals or exceeds<br><br>before the sample time of<br><br>is reached | 3.00 counts (equivalent to 1,000.01 milliseconds)<br><br>1,000.01 milliseconds | General Enable Criteria:<br><br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>All below criteria have been met for<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run<br><br>If calibratable low voltage disable mode is not Never Disabled<br>Low voltage disable mode: OBDII | > 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts<br><br>>=11.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication Bus B Off | U0074 | This DTC monitors for a BUS B off condition | Bus off failures equals or exceeds<br><br>before the sample time of<br><br>is reached | 3.00 counts (equivalent to 1,000.01 milliseconds)<br><br>1,000.01 milliseconds | General Enable Criteria:<br><br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>All below criteria have been met for<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run<br><br>If calibratable low voltage disable mode is not Never Disabled<br>Low voltage disable mode: OBDII | > 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts<br><br>>=11.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication Powertrain Sensor CAN Bus Off | U0076 | This DTC monitors for a Powertrain Sensor Bus S off condition | Bus off failures equals or exceeds<br><br>before the sample time of<br><br>is reached | 3.00 counts (equivalent to 1,000.01 milliseconds)<br><br>1,000.01 milliseconds | General Enable Criteria:<br><br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>All below criteria have been met for<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run<br><br>If calibratable low voltage disable mode is not Never Disabled<br>Low voltage disable mode: OBDII | > 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts<br><br>>=11.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with TCM | U0101 | This DTC monitors for a loss of communication with the TCM. | Message is not received from controller for<br>Message $01E:<br><br>Message $026:<br><br>Message $027:<br><br>Message $02D:<br><br>Message $02E:<br><br>Message $031:<br><br>Message $032:<br><br>Message $0BB:<br><br>Message $0CD:<br><br>Message $216:<br><br>Message $27A:<br><br>Message $452:<br><br>Message $459: | <br>>406.25 ms<br><br>>406.25 ms<br><br>>406.25 ms<br><br>>406.25 ms<br><br>>406.25 ms<br><br>>406.25 ms<br><br>>10,000.00 ms<br><br>>9,862.50 ms<br><br>>362.50ms<br><br>>337.50ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>2,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled Or Controller is an OBD controller | Disabled | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Anti-Lock Brake System (ABS) Control Module | U0121 | This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module. | Message is not received from controller for<br>Message $012:<br>Message $014:<br>Message $015:<br>Message $017:<br>Message $01A:<br>Message $081:<br>Message $082:<br>Message $210:<br>Message $211:<br>Message $219:<br>Message $21B:<br>Message $415:<br>Message $42A: | <br>>10,000.00 ms<br>>412.50 ms<br>>412.50 ms<br>>412.50 ms<br>>412.50 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>> 500.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>325.00 ms<br>>700.00 ms<br>>10,000.00 ms | General Enable Criteria:<br>All below criteria have been met for<br>If message is on Bus A: U0073 not active<br>If message is on Bus B: U0074 not active<br>If message is on Bus S: U0076 not active<br>CAN channel is requesting full communications<br>Normal CAN transmission on Bus is enabled<br>If bus type is Sensor Bus, sensor bus relay is on<br>Accessory mode to off mode not pending<br>Battery voltage<br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br>Controller type:<br>OBD Controller<br>If power mode = Run/ Crank:<br>Power Mode is run | <br>>=5,000.00 ms<br>>11.00 Volts<br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Message $57D: | >10,000.00 ms | | | | |
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: | | | |
| | | | | | Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: | | | |
| | | | | | Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: | | | |
| | | | | | Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or | | | |
| | | | | | Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: | | | |
| | | | | | Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or | | | |
| | | | | | Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Battery voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Power Steering Control Module | U0131 | This DTC monitors for a loss of communication with the Power Steering Control Module. | Message is not received from controller for Message $023: | >10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | >=5,000.00 ms<br><br>>11.00 Volts<br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Body Control Module | U0140 | This DTC monitors for a loss of communication with the Body Control Module. | Message is not received from controller for<br>Message $010:<br><br>Message $202:<br><br>Message $203:<br><br>Message $204:<br><br>Message $205:<br><br>Message $228:<br><br>Message $25E:<br><br>Message $274:<br><br>Message $284:<br><br>Message $404:<br><br>Message $407:<br><br>Message $409:<br><br>Message $40A: | <br>>412.50 ms<br><br>>10,000.00 ms<br><br>>325.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>325.00 ms<br><br>>700.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Message $40C: | >10,000.00 ms | | | | |
| | | | Message $413: | >10,000.00 ms | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | Message $460: | >10,000.00 ms | Low voltage disable mode: OBDII | | | |
| | | | Message $461: | >10,000.00 ms | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | Message $47E: | >10,000.00 ms | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | Message $47F: | >10,000.00 ms | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | Message $481: | >10,000.00 ms | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | Message $49F: | >10,000.00 ms | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | Message $4EB: | >2,000.00 ms | If power mode = Accessory: | | | |
| | | | Message $54D: | >10,000.00 ms | Off key cycle diagnostics are enabled | Disabled | | |
| | | | Message $590: | >10,000.00 ms | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Restraints Control Module | U0151 | This DTC monitors for a loss of communication with the Restraints Control Module. | Message is not received from controller for<br>Message $024:<br><br>Message $0D1:<br><br>Message $0D2:<br><br>Message $441:<br><br>Message $442: | <br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>2,000.00 ms<br><br>>2,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | TypeC, 1 Trip No MIL Emissions Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | .Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Active Grill Air Shutter Module A | U0284 | This DTC monitors for a loss of communication on the LIN bus 1 with Shutter Module A. | Message is not received from controller for<br><br>ACM1_Rsp | <br><br>>=1,250.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized Slave is calibrated as present<br><br>Actuator relay is powered Or<br><br>Powertrain Relay is on and powertrain relay state feedback is enabled<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br><br>If calibratable low voltage disable mode is not Never | <br><br>Enabled<br><br>Enabled<br><br><br><br><br><br><br><br>>= 5,000.00 milliseconds<br><br><br><br><br>>11.00 Volts<br><br><br><br><=18.00 Volts | LIN bus communication executes in 500ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 milliseconds | | |
| | | | | | Or Run/Crank ignition voltage | >8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | Disabled | | |
| | | | | | Off key cycle diagnostics are enabled Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | >=11.00 Volts | | |
| | | | | | Battery voltage | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Transmission Control Module | U0402 | This DTC monitors for an error in communication with the Transmission Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | Type A, 1 Trips |
| | | | TGI2P_ARC: | 5.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | TrnsGnrInfo2_Prtctd: | 5.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | TORSP_ARC: | 5.00 fail counts out of 11.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | TransOutRotSts_Prtctd: | 5.00 fail counts out of 11.00 sample counts | Controller type: OBD Controller | | | |
| | | | TGIP_ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TrnsGnrInfo_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TRDP-ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TCMGnrlInfo1_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TEGP_ARC: | 5.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 11.00 sample counts | | | | |
| | | | TrnsEstGr_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TGI3_ARC: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | TGI3_CS: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | TGI4_ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | TGI4_CS: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Transfer Case Control Module | U0403 | This DTC monitors for an error in communication with the Transfer Case Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>SAP_ARC:<br><br>SecAxl_Prtctd: | <br><br><br><br><br>5.00 fail counts out of 11.00 sample counts<br><br>5.00 fail counts out of 11.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br><br>>=5,000.00 ms<br><br>>= 11.00 volts<br><br><br><br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Gear Shift Control Module A | U0404 | This DTC monitors for an error in communication with the Gear Shift Control Module A. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | Type B, 2 Trips |
| | | | LS1ISP_ARC: | 4.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | LnrSnsrl lnSec_Prtctd: | 8.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | LS2ISP_ARC: | 4.00 fail counts out of 11.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | LnrSnsr2lnSec_Prtctd: | 8.00 fail counts out of 11.00 sample counts | Controller type: OBD Controller | | | |
| | | | DISSP.ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | DscrlnSnsrSeC-Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | EALUCSP.ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | ExtrnALUChkSeC-Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | DISP_ARC: | 8.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 11.00 sample counts | | | | |
| | | | DISP_CS: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | LSIP_ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | LSIP_CS: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | EALUCPP.ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | ExtrnALUChkPri_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Brake System Control Module | U0418 | This DTC monitors for an error in communication with the Brake System Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | Type A, 1 Trips |
| | | | BSIS2P_ARC: | 8.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | BrkSysInfoSts2_Prtctd: | 8.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | CSBTP-ARC: | 5.00 fail counts out of 11.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | ChsSysBrkTrq_Prtctd: | 5.00 fail counts out of 11.00 sample counts | Controller type: OBD Controller | | | |
| | | | FrntAngVel_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | RearAngVel_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | BSIRP_ARC: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | EBCMGnrlInfo1_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | SWIP_ARC: | 8.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 11.00 sample counts | | | | |
| | | | StrgWhllnfo_Prtctd: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | BSISP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BrkSyslnfoSts_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | WRDSP.ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | EBCMGnrllnfo2_Prtctd: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | DMCP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | EBCMGnrllnfo3_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BSIR3P_ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | BrkSyslnfoReqs3_Prtctd: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | EPBSP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | ElecPrkBrkSts_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BSSIP_ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | BrkSysStsInfo_Prtctd: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Power Steering Control Module | U0420 | This DTC monitors for an error in communication with the Power Steering Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>SWIP_ARC:<br><br>StrgWhllnfo_Prtctd: | <br><br><br><br>8.00 fail counts out of 11.00 sample counts<br><br>8.00 fail counts out of 11.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br>>=5,000.00 ms<br><br>>= 11.00 volts<br><br><br><br><br><br><= 18.00 volts | Executes in 12.5ms loop. | TypeC, 1 Trip No MIL Emissio ns Neutral |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Body Control Module | U0422 | This DTC monitors for an error in communication with the Body Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | Type B, 2 Trips |
| | | | BGI3P_ARC: | 5.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | BdyGenInfo3_Prtctd: | 5.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | BVSCP.ARC: | 4.00 fail counts out of 10.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | BdyVehSpdCtl_Prtctd: | 4.00 fail counts out of 10.00 sample counts | Controller type: OBD Controller | | | |
| | | | SPMP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | SysPwrMode_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BGI1P.ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BdyGenInfo1_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | CCHI_ARC: | 7.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 10.00 sample counts | | | | |
| | | | CCHI_CS: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | RTPP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | BCMGnrlInfo1_Prtctd: | 5.00 fail counts out of 11.00 sample counts | | | | |
| | | | CCCGI-ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Gateway A | U0447 | This DTC monitors for an error in communication with the Gateway A. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>BSPMP_ARC:<br><br>BkupSysPwrMode_Prtctd: | <br><br><br><br><br>4.00 fail counts out of 10.00 sample counts<br><br>4.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br><br>>=5,000.00 ms<br><br>>= 11.00 volts<br><br><br><br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Restraints Control Module | U0452 | This DTC monitors for an error in communication with the Restraints Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | TypeC, 1 Trip No MIL Emissions Neutral |
| | | | IMUSR2_ARC: | 8.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | IMUSR2_CS: | 8.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | IMUSR1P.ARC: | 8.00 fail counts out of 11.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | IMII SnsrRw1_Prtctd: | 8.00 fail counts out of 11.00 sample counts | Controller type: OBD Controller | | | |
| | | | ORIP-ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | OccptRstrntlnfo_Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | PCIP_ARC: | 4.00 fail counts out of 10.00 sample counts | | | | |
| | | | PstCIsnlnfo-Prtctd: | 4.00 fail counts out of 10.00 sample counts | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Active Grill Air Shutter Module A | U0585 | This DTC monitors for an error in communication with the Active Grill Air Shutter Module A. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>ACMIJnitStatARC: | 7.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | >=5,000.00 ms<br><br>>= 11.00 volts<br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From DC/DC Converter Control Module A | U0599 | This DTC monitors for an error in communication with the DC/DC Converter Control Module A. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>DCCnvActrVltADCValARC:<br><br>DCCnvActrVltADCValPVal:<br><br>DCCCnvCrnkCtlTrmStARC:<br><br>DCCCnvCrnkCtlTrmStPVal: | 8.00 fail counts out of 11.00 sample counts<br><br>8.00 fail counts out of 11.00 sample counts<br><br>8.00 fail counts out of 11.00 sample counts<br><br>8.00 fail counts out of 11.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | >=5,000.00 ms<br><br>>= 11.00 volts<br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Throttle Position Sensor 1 | U0606 | Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 1 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol.<br>Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold.<br>This diagnostic only runs when battery voltage is high enough. | Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol<br><br>OR<br><br>Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol<br><br>OR<br><br>Message Pulse <<br>Message Pulse ><br><br>OR<br><br>Message Age Limit >=<br><br>OR<br><br>Signal CRC fails | 0.5 V<br><br>OR<br><br>4.1 V<br><br>OR<br><br>0.125977 ms<br>0.209991 ms<br><br>OR<br><br>3.125 ms | Run/Crank voltage | >6.41 Volts | 79/159 counts;<br><br>57 counts continuous;<br><br>3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Throttle Position Sensor 2 | U0607 | Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 2 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol.<br>Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold.<br>This diagnostic only runs when battery voltage is high enough. | Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol<br><br>OR<br><br>Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol<br><br>OR<br><br>Message Pulse <<br>Message Pulse ><br><br>OR<br><br>Message Age Limit >=<br><br>OR<br><br>Signal CRC fails | 0.5 V<br><br>OR<br><br>4.1 V<br><br>OR<br><br>0.125977 ms<br>0.209991 ms<br><br>OR<br><br>3.125 ms | Run/Crank voltage | >6.41 Volts | 79/159 counts;<br><br>57 counts continuous;<br><br>3.125 ms /count in the ECM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Mass or Volume Air Flow Sensor A | U060F | This DTC monitors for a loss of communication on the LIN bus 2 with Mass or Volume Air Flow Sensor A. | Message is not received from controller for<br><br>MAF1_Press_Rsp<br><br>MAF1_TmpHum_Rsp | <br><br>>=87.50 milliseconds<br><br>>= 250.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br><br>Slave is calibrated as present<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br>If calibratable low voltage disable mode is not Never Disabled<br><br>Low voltage disable mode: OBDII<br><br>IfOBDII:<br>Run/Crank ignition voltage | <br>Enabled<br><br>Enabled<br><br><br><br><br>>= 5,000.00 milliseconds<br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts<br><br><br><br><br><br><br><br><br><br><br><br><br>>=11.00 Volts | LIN bus communication executes in 500ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Loss of Communication with Auxiliary Electric Water Pump | U0623 | This DTC monitors for a loss of communication on the LIN bus 1 with the Auxiliary Electric Water Pump | Message is not received from controller for<br><br>AWP_Rsp | >=2,500.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized Slave is calibrated as present<br><br>Actuator relay is powered<br>Or<br>Powertrain Relay is on and powertrain relay state feedback is enabled<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br>If calibratable low voltage disable mode is not Never Disabled<br><br>Low voltage disable mode: OBDII | <br><br>Enabled<br><br>Enabled<br><br><br><br><br><br><br><br>>= 5,000.00 milliseconds<br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | LIN bus communication executes in 500ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>>=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Fuel Rail Pressure Sensor Bank 1 | U0625 | This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating low. | The number pulses on the SENT signal line<br><br>SENT Signal Line State | <= 4<br><br>= Low | SENT Sensor Communication Circuit Diagnostic Enabled<br><br>SENT power up delay | True<br><br>>= 0.00 seconds<br><br>Enabled when a code clear is not active or not exiting device control | 400 failures out of 500 samples<br><br>6.25 ms per sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 1 LIN Communication Failure | U0632 | This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 1. | Message is not received from controller for<br><br>CFM1_RSP | >=2,500.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br>Slave is calibrated as present<br><br>Engine is running<br>Or<br>Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br>If calibratable low voltage disable mode is not Never Disabled | Enabled<br><br>Enabled<br><br>>=0.00 milliseconds<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | LIN bus communication executes in 500ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Low voltage disable mode: OBDII<br><br>IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>>=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cooling Fan 2 LIN Communication Failure | U0633 | This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 2. | Message is not received from controller for<br><br>CFM2_RSP | >=2,500.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br>Slave is calibrated as present<br><br>Engine is running<br>Or<br>Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br>If calibratable low voltage disable mode is not Never Disabled | Enabled<br><br>Enabled<br><br>>=0.00 milliseconds<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | LIN bus communication executes in 500ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Low voltage disable mode: OBDII<br><br>IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>>=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Fuel Temperature SensorA | U0670 | This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high. | The number pulses on the SENT signal line<br><br>SENT Signal Line State | <= 4<br><br>= High | SENT Sensor Communication Circuit Diagnostic Enabled<br><br>SENT power up delay | True<br><br>>= 0.00 seconds<br><br>Enabled when a code clear is not active or not exiting device control | 400 failures out of 500 samples<br><br>6.25 ms per sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Fuel Temperature Sensor B | U0671 | This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high. | The number pulses on the SENT signal line<br><br>SENT Signal Line State | <= 4<br><br>= High | SENT Sensor Communication Circuit Diagnostic Enabled<br><br>SENT power up delay | True<br><br>>= 0.00 seconds<br><br>Enabled when a code clear is not active or not exiting device control | 400 failures out of 500 samples<br><br>6.25 ms per sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Communicati on CAN Bus 1 Off | U1002 | This DTC monitors for a Central Gateway Module Communication CAN Bus 1 Off as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 1 Off DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Communicati on CAN Bus 3 Off | U1004 | This DTC monitors for a Central Gateway Module Communication CAN Bus 3 Off as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 3 Off DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Communicati on CAN Bus 5 Off | U1006 | This DTC monitors for a Central Gateway Module Communication CAN Bus 5 Off as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 5 Off DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Module PT Private CAN Bus Enable Diagnostic Status | U100B | Detects if PT private CAN wake up wire is shorted to low or open circuited. | PT sensor bus wake up wire voltage | <= 1.5 Volts | Iginition<br><br>Run/Crank wired signal = | Run or Run/Crank<br><br>active (high level) | 4.5 seconds in 5.5 second window | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Fuel Tank Zone Module Configuratio n Error | U101A | FTZM Pump Control Configuration Management provides a method for a Diagnostic and Emissions-Critical Electronic Control Unit (DEC ECU) to communicate configuration information to an OBD Smart Device (SD); in this case the FTZM. The FTZM contains pre-loaded sets of calibrations, each of which specifies proper tuning values for electronic commutation of corresponding fuel pump motor variants including a default value that denotes a non-operational [factory default] pump variant. This configuration management feature provides a method to reduce the number of FTZM end-item part numbers. The Configuration Error Diagnostic runs every 100ms to verify that a calibration index value is present that is not the factory default value. When the diagnostic identifies that the default index value is loaded, the | FTZM Fuel Pump Configuration Calibration Index Value | = Factory Default Index Value<br>OR<br>= Not Configured Index Value [device failed to accept calibration value on 1st wake-up] | a] Diagnostic is ..<br>b] Device feedback Faulted;<br>c] Diagnostic system disabled;<br>d] CAN serial data message $3C8 received | a] Enabled<br>b] <>True;<br>c] <>True;<br>d] =TRUE | 6.00 failures of 8.00 samples ;<br>100 millisec/ sample | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | DTC is set. | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Fuel Rail Pressure Sensor Bankl Sensor 2 | U101B | This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high. | The number pulses on the SENT signal line<br><br>SENT Signal Line State | <= 4<br><br>= High | SENT Sensor Communication Circuit Diagnostic Enabled<br><br>SENT power up delay | True<br><br>>= 0.00 seconds<br><br>Enabled when a code clear is not active or not exiting device control | 400 failures out of 500 samples<br><br>6.25 ms per sample<br>Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Cooling Fan Motor 1 | U1314 | This DTC monitors for an error in communication with the Cooling Fan Motor 1. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>PrplCoolFn1_ARC: | 7.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | >=5,000.00 ms<br><br>>= 11.00 volts<br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Cooling Fan Motor 2 | U1315 | This DTC monitors for an error in communication with the Cooling Fan Motor 2. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>PrplCoolFn2_ARC: | 7.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | >=5,000.00 ms<br><br>>= 11.00 volts<br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Mass Air Flow Sensor 1 | U1319 | This DTC monitors for an error in communication with the Mass Air Flow Sensor 1. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>PAMITempHmdtyARC:<br><br>PAMIPresARC: | <br><br><br><br>7.00 fail counts out of 10.00 sample counts<br><br>8.00 fail counts out of 11.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br>>=5,000.00 ms<br><br>>= 11.00 volts<br><br><br><br><br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Fuel TankZone Module | U131D | This DTC monitors for an error in communication with the Fuel TankZone Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. | | Executes in 12.5ms loop. | Type A, 1 Trips |
| | | | FTZMInfolARC: | 8.00 fail counts out of 11.00 sample counts | All the following conditions are met for: | >=5,000.00 ms | | |
| | | | | | Battery voltage | >= 11.00 volts | | |
| | | | FTZMInfolChksm: | 8.00 fail counts out of 11.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | FTZMInfo11ARC: | 8.00 fail counts out of 11.00 sample counts | If controller is a non-OBD controller then battery voltage | <= 18.00 volts | | |
| | | | FTZMInfo11Chksm: | 8.00 fail counts out of 11.00 sample counts | Controller type: OBD Controller | | | |
| | | | FTZMInfo8ARC: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo8Chksm: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo2ARC: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo2Chksm: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo12ARC: | 8.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 11.00 sample counts | | | | |
| | | | FTZMInfo12Chksm: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo14ARC: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo14Chksm: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo3ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo3Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo4ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo4Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo5ARC: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo5Chksm: | 8.00 fail counts out of 11.00 sample counts | | | | |
| | | | FTZMInfo16ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | FTZMInfo16Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo6ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo6Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo7ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo7Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo9ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo9Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo13ARC: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | FTZMInfo13Chksm: | 7.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Control Module LIN Bus 1 | U1345 | This DTC monitors for a LIN bus off condition on LIN Bus 1. | Loss of Communication Method:<br><br>The total number of diagnostic enabled slave nodes on LIN Bus 1<br><br>Or<br>LIN channel Wakeup Method:<br><br>LIN channel wakeup repetition counter | <br><br>= Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs<br><br><br><br>>= 10.00 counts | Loss of Communication Method:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized<br><br>All below criteria have been met for:<br><br>LIN channel is requesting full communications<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run<br><br>If calibratable low voltage disable mode is not Never Disabled<br><br>Low voltage disable mode: OBDII<br><br>IfOBDII: | <br><br>Enabled<br><br>Enabled<br><br><br><br>>= 5,000.00 milliseconds<br><br><br><br><br><br>>11.00 Volts<br><br><br><br><=18.00 Volts | Dependent on bus loading. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage<br><br>LIN channel Wakeup Method:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>_LINchannel is requesting_ | >=11.00 Volts<br><br>>=9.00 Volts<br><br>>15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts<br><br>Enabled<br><br>Enabled | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | full communications<br><br>LIN module is initialized<br><br>The following criteria have been enabled for:<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage | >= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Engine Control Module LIN Bus 2 | U1346 | This DTC monitors for a LIN bus off condition on LIN Bus 2. | Loss of Communication Method: | | Loss of Communication Method: | | Dependent on bus loading. | Type B, 2 Trips |
| | | | The total number of diagnostic enabled slave nodes on LIN Bus 2 | = Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs | Diagnostic is enabled | Enabled | | |
| | | | | | LIN channel is enabled | Enabled | | |
| | | | | | LIN module is initialized | | | |
| | | | | | All below criteria have been met for | >= 5,000.00 milliseconds | | |
| | | | Or | | | | | |
| | | | LIN channel Wakeup Method: | | LIN channel is requesting full communications | | | |
| | | | | | Accessory mode to off mode not pending | | | |
| | | | LIN channel wakeup repetition counter | >=10.00 counts | Battery voltage | >11.00 Volts | | |
| | | | | | Conroller is an OBD controller<br>Or<br>Battery Voltage | <=18.00 Volts | | |
| | | | | | Controller type:<br>OBD Controller | | | |
| | | | | | If power mode = Run/ Crank: | | | |
| | | | | | Power Mode is run | | | |
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Run/Crank ignition voltage<br><br>If EOBD:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage<br><br>LIN channel Wakeup Method:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>_LINchannel is requesting_ | >=11.00 Volts<br><br>>=9.00 Volts<br><br>> 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts<br><br>Enabled<br><br>Enabled | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | full communications<br><br>LIN module is initialized<br><br>The following criteria have been enabled for:<br><br>Accessory mode to off mode not pending<br><br>Battery voltage | >= 5,000.00 milliseconds<br><br>>11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Received Invalid Data From Body Control Module | U137B | Detects invalid data coming from the BCM. | Invalid Data Received from BCM | Invalid MAC, Alive Rolling Count, or Protection Value | CAN Communication<br><br>System Voltage | Enabled<br><br>Voltage in Range | XofY threshold: 8/10 | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Received Invalid Data from Central Gateway Module | U137C | Detects invalid data coming from the CGM. | Invalid Data Received from CGM | Invalid MAC, Alive Rolling Count, or Protection Value | CAN Communication<br><br>System Voltage | Enabled<br><br>Voltage in Range | XofY threshold: 8/10 | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Received Invalid Data from ECM | U137D | Detects invalid data coming from the ECM. | Invalid Data Received from ECM | Invalid MAC, Alive Rolling Count, or Protection Value | CAN Communication<br><br>System Voltage | Enabled<br><br>Voltage in Range | XofY threshold: 8/10 | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Auxiliary Water Pump Motor | U137E | This DTC monitors for an error in communication with the Auxiliary Water Pump Motor. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:<br><br>AuxCoolPmpARC: | 7.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | >=5,000.00 ms<br><br>>= 11.00 volts<br><br><= 18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Invalid Data Received from Body Control Module | U137F | This DTC monitors for a Central Gateway Module Invalid Data Received from Body Control Module error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Invalid Data Received from Body Control Module DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>BCM | <br><br>is being received<br><br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1 | U1600 | This DTC monitors for a loss of communication on the LIN bus 1 with Transmission Control Module on Engine Control Module | Message is not received from controller for<br><br>TCM_RSP | >= 150.00 milliseconds | General Enable Criteria:<br><br>Diagnostic is enabled<br><br>LIN channel is enabled<br><br>LIN module is initialized Slave is calibrated as present<br><br>All below criteria have been met for<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br>Power Mode is run<br>If calibratable low voltage disable mode is not Never Disabled<br><br>Low voltage disable mode: OBDII<br><br>IfOBDII:<br>Run/Crank ignition voltage<br><br>If EOBD: | Enabled<br><br>Enabled<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts<br><br>>=11.00 Volts<br><br>>=9.00 Volts | LIN bus communication executes in 500ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | > 15,000.00 milliseconds<br><br>>8.41 Volts<br><br>>=6.41 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Gateway A on CAN 2 | U1608 | This DTC monitors for a loss of communication with the Gateway A on CAN 2. | Message is not received from controller for<br>Message $209:<br><br>Message $425:<br><br>Message $427:<br><br>Message $490:<br><br>Message $494:<br><br>Message $561:<br><br>Message $562: | <br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Central Gateway Module on CAN Bus 3 | U1609 | This DTC monitors for a loss of communication with the Central Gateway Module on CAN Bus 3. | Message is not received from controller for<br>Message $209:<br><br>Message $20D:<br><br>Message $25F:<br><br>Message $457:<br><br>Message $458:<br><br>Message $45A:<br><br>Message $561: | <br>>10,000.00 ms<br><br>>325.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Fuel Pump Driver Control Module | U18A2 | This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module. | Message is not received from controller for<br>Message $0C3:<br>Message $0C4:<br>Message $0CB:<br>Message $0CC:<br>Message $1E6:<br>Message $2C1:<br>Message $2D7:<br>Message $2D9:<br>Message $3C8:<br>Message $3EB:<br>Message $3EC:<br>Message $3EE:<br>Message $4C6: | >10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms<br>>10,000.00 ms | General Enable Criteria:<br>All below criteria have been met for<br>If message is on Bus A: U0073 not active<br>If message is on Bus B: U0074 not active<br>If message is on Bus S: U0076 not active<br>CAN channel is requesting full communications<br>Normal CAN transmission on Bus is enabled<br>If bus type is Sensor Bus, sensor bus relay is on<br>Accessory mode to off mode not pending<br>Battery voltage<br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br>Controller type:<br>OBD Controller<br>If power mode = Run/ Crank:<br>Power Mode is run | >=5,000.00 ms<br>>11.00 Volts<br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus | U18C6 | Detects that CAN serial data communication has been lost with the ECM. | Powertrain Sensor Bus Message $1E2 OR $1E8 | Undetected | Ignition Run/Crank Voltage<br><br>Ignition | 11V<RC Volt < 32V<br><br>= Run/Crank<br><br>OR<br><br>= Accessory | 1.0 second | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Expansion CAN Bus | U18C7 | Detects that CAN serial data communication has been lost with the ECM. | CAN frames sent from the ECM on CAN3 (Global B) or Powertrain Expansion (Global A) not received. | Undetected | CAN Communication<br><br>System Voltage | Enabled<br><br>In Range | 10 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus | U18D2 | This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus. | Message is not received from controller for<br>Message $1E4:<br><br>Message $1EC:<br><br>Message $2F3:<br><br>Message $32D:<br><br>Message $4C4: | <br>>10,000.00 ms<br><br>≥ 662.50 ms<br><br>>10,000.00 ms<br><br>> 500.00 ms<br><br>>10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br><br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled Or Controller is an OBD controller | Disabled | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus | U18D3 | This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus. | Message is not received from controller for<br>Message $0BC:<br><br>Message $0BD:<br><br>Message $0C1:<br><br>Message $0CF: | <br>>10,000.00 ms<br><br>>10,000.00 ms<br><br>>600.00 ms<br><br>>600.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | <br><br>>=5,000.00 ms<br><br><br><br><br><br><br><br><br><br><br><br><br><br>>11.00 Volts<br><br><br><br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with DC to DC Converter on Powertrain Sensor Bus | U18E2 | This DTC monitors for a loss of communication with the DC to DC Converter on Powertrain Sensor Bus. | Message is not received from controller for Message $0A8:<br><br>Message $1C9: | >10,000.00 ms<br><br>>10,000.00 ms | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | >=5,000.00 ms<br><br>>11.00 Volts<br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled | | | |
| | | | | | Low voltage disable mode: OBDII | | | |
| | | | | | IfOBDII: Run/Crank ignition voltage | >=11.00 Volts | | |
| | | | | | If EOBD: Run/Crank ignition voltage | >=9.00 Volts | | |
| | | | | | If Secure: Starter motor engaged for | > 15,000.00 ms | | |
| | | | | | Or Run/Crank ignition voltage | > 8.41 Volts | | |
| | | | | | If Hybrid Secure: Run/Crank ignition voltage | >=6.41 Volts | | |
| | | | | | If power mode = Accessory: | | | |
| | | | | | Off key cycle diagnostics are enabled | Disabled | | |
| | | | | | Or Controller is an OBD controller | | | |
| | | | | | Controller shutdown is not impending | | | |
| | | | | | Power Mode is not run/ crank | | | |
| | | | | | .Batterv voltage | >=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned / Authoritative Counter At Maximum | U1960 | This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value | During controller initialization:<br><br>IF (Any Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(Any Authoritative Counter is at MAX value)<br><br>During controller operation:<br><br>IF (A Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(An Authoritative Counter is at MAX value) | | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1961 (Security Peripheral Performance ) | U1961 | This DTC indicates that the ECU security peripheral has reported that it has failed. | The ECU security peripheral reports that the security peripheral hardware has failed. | | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1962 (Unable to Authenticate Serial Data Message) | U1962 | This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle. | Message authentication on a single key slot has failed a configurable number of times. | KeSSAR_Cnt_SecKey SlotFailLimit | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Key Table Not Provisioned | U1970 | Detects when Key Slot Provision indicates security peripheral is not legitimate | 1) The Authoritative Counter reaches its maximum value.<br>2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0.<br>3) The DTC can be also set upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP). | | CAN Communication = | Enabled | 1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU power-up.<br>3) Monitored while RID 0x0200: Provision Security Peripheral General Keys is being executed. | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Unable to Authenticate Serial Data Message | U1972 | Detects error in MAC caused by Security Peripheral hardware | A Message Authentication Code results in failed verification based on the programmed key table. | Three consecutive failed authentication in a key slot | CAN Communication | = Enabled | | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Vehicle Identification Number of First Vehicle Not Programmed | U1978 | This DTC checks that the VIN of the first vehicle is correctly written | At least one of the programmed VIN of the first vehicle digits | Not a valid ASCII value | KeVIND_b_VI N_OFV_N P _EnableDTC | = 1 | 250 ms /test Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Self-Learn Did Not Execute | U197B | This DTC monitors for a Central Gateway Module Self-Learn Did Not Execute error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Did Not Execute DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module ECU Identification List Memory Fault | U197C | This DTC monitors for a Central Gateway Module ECU Identification List Memory Fault error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module ECU Identification List Memory Fault DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Self-Learn Invalid DueToVIN Mismatch | U197D | This DTC monitors for a Central Gateway Module Self-Learn Invalid Due ToVIN Mismatch error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Invalid DueToVIN Mismatch DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Key Table Not Provisioned | U1982 | This DTC monitors for a Central Gateway Module Key Table Not Provisioned error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Key Table Not Provisioned DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Security Peripheral Performance – Performance or Incorrect Operation | U1983 | This DTC monitors for a Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Unable To Authenticate Serial Data Message | U1984 | This DTC monitors for a Central Gateway Module Unable To Authenticate Serial Data Message error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Unable To Authenticate Serial Data Message DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Lost Communication with Central Gateway Module | U2201 | Detects that CAN serial data communication has been lost with the CGM on CAN 3. | CAN frames originating from the CGM not received. | Begins to mature when message has not arrived in 2.5x nominal transmit rage. | CAN Communication<br><br>DTC Type (0 = disabled) | = Enabled<br><br>6.00 | 10 seconds to set DTC | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Body Control Module | U2203 | This DTC monitors for a Central Gateway Module Lost Communication with Body Control Module error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Body Control Module DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>BCM | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with HVAC Display - Front | U2209 | This DTC monitors for a Central Gateway Module Lost Communication with HVAC Display - Front error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with HVAC Display - Front DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>HVAC Display - Front | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Shifter Interface Board Module | U220D | This DTC monitors for a Central Gateway Module Lost Communication with Shifter Interface Board Module error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Shifter Interface Board Module DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>SIB | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Transmission Control Module | U220F | This DTC monitors for a Central Gateway Module Lost Communication with Transmission Control Module error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Transmission Control Module DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>TCM | <br><br>is being received<br><br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Lost Communication with Body Control Module | U2215 | Detects loss of communication from the BCM on CAN2 (PDU routed from GCM to SIB on CAN3). | CAN frames sent from the BCM (PDU routed through the CGM) are not detected | Begins to mature when message has not arrived in 2.5x nominal transmit rage. | CAN Communication | = Enabled | 10 seconds to set DTC | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Shifter Interface Board Lost Communication with Engine Control Module on CAN Bus 2 | U2405 | Detects loss of communication from the ECM on CAN2 (PDU routed from GCM to SIB on CAN3). | CAN frames sent from the ECM (PDU routed through the CGM) are not detected | Begins to mature when message has not arrived in 2.5x nominal transmit rage. | CAN Communication | = Enabled | 10 seconds to set DTC | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module High Speed CAN Bus Off | U2413 | This DTC monitors for a Central Gateway Module High Speed CAN Bus Off error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module High Speed CAN Bus Off DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module | <br><br>is being received<br><br><br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 | U2418 | This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>BSCM | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 | U2419 | This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>BSCM | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 | U241C | This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>ECM | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Central Gateway Module Lost Communication with Engine Control Module on CAN Bus3 | U241D | This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 error as determined by the CGM | A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 DTC has set in the CGM.<br><br>See CGM summary pages for more information. | | General Enable Criteria:<br><br>The corresponding index within the CGM Diagnostic Status Message Signal<br><br>Central Gateway Module<br><br>ECM | <br><br>is being received<br><br><br><br>is present on the bus<br><br>is present on the bus | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Transmission Control Module to Electronic Transmission Control Module on LIN BUS. | U250D | Detects if Range Command Echo from TCM matches current Range Command (For Internal ETRS only) | Check Range Command Echo vs Range Command when Range Command Poke is called | Range Command Echo # Range Command | Diagnostic Enable Calibration<br><br>Recent Range Command Transition<br><br>TCM LIN Node or Bus Fault Active | = TRUE<br><br>= FALSE<br><br>= FALSE | 80 failures out of 100 samples<br>50 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Odometer Vehicle Identification Number Not Programmed | U2A90 | This DTC checks that the odometer VIN is correctly written | At least one of the programmed odometer VIN digits | Not a valid ASCII value | KeVIND_b_Odo_VI N_N P _EnableDTC | = 1 | 250 ms /test Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Odometer Vehicle Identification Number Invalid Configuratio n | U2A91 | This DTC checks that the odometer VIN matches the ECU VIN | At least one of the programmed odometer VIN digits | Does not match the ECU VIN digits. | KeVIND_b_OdoVIN_Ena bleDTC | = 1 | 250 ms / test Continuous | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation | U3023 | Detect a Power A vs RuncCrank correlation error | Power A - RunCrank - Voltage | > 3.00 | PowerA- RunCrank Correlation monitoring enable = TRUE<br><br>Battey Present<br><br>RunCrank Active<br><br>Starter Motor NOT Engaged | Diagnostcis 1.00<br><br>Battey Present = TRUE<br>RunCrank Active = TRUE<br><br>Starter Motor Engaged = FALSE | 50.00 failures out of 63.00 | TypeC, 1 Trip No MIL Emissio ns Neutral |

## Initial Supporting table - CalculatedPerfMaxIcl

**Description:** Maximum desired camshaft position for Intake CAM - BankI

**Value Units:** Maximum desired camshaft position (degCam)
**X Unit:** Engine Oil Temperature (degC)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[-40 -28-16-4 8 20 32 44 56 68 80 92 104 116128 140 152]
**Y Units:** Engine Speed (rpm)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800]

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 2 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 3 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 4 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 5 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 6 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 7 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 8 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 9 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 10 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 11 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 12 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 13 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 14 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 15 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 16 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| 17 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |

# Initial Supporting table - FastFailTempDiff

**Description:** EOT Sensor Cold Start Fast Fail Threshold

**Value Units:** Threshold between power-up engine oil temperature and power-up engine coolant temperature (Deg C)
**X Unit:** Powerllp coolant temperature (deg C)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 80.0 | 80.0 | 80.0 | 60.0 | 60.0 | 40.0 | 40.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |

# Initial Supporting table - P0196_TotalAccumulatedFlow

**Description:** Total accumulated air consumed by engine since engine start as a function of powerup undefaulted Oil Temperature

**Value Units:** Minimum accumulated (total) air grams consumed by engine (gram)
**X Unit:** Powerllp coolant temperature (deg C)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15,000 | 14,000 | 13,000 | 12,000 | 11,000 | 10,000 | 9,000 | 8,000 | 7,000 | 6,000 | 5,000 | 4,000 | 5,000 | 4,000 | 3,000 | 3,000 | 3,000 |

# Initial Supporting table - P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump

**Description:** Engine Load Stability Weighting Factor - Single Stage Oil Pump

**Value Units:** Weight factor for engine load stability (none)
**X Unit:** Engine load stability (milligram)

| y/x | 0 | 5 | 10 | 20 | 30 | 50 | 100 | 200 | 399 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.00 | 1.00 | 0.50 | 0.30 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |

# Initial Supporting table - P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump

**Description:** Oil Pressure Predicted Weighting Factor - Single Stage Oil Pump

**Value Units:** Weight factor for engine oil pressure prediction (none)
**X Unit:** Predicted oil pressure (kPa)

| y/x | 0 | 170 | 250 | 275 | 360 | 375 | 400 | 500 | 600 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.10 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.00 |

# Initial Supporting table - P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump

**Description:** Oil Temperature Weighting Factor - Single Stage Oil Pump

**Value Units:** Weight factor for the engine oil temperature (none)
**X Unit:** Filtered oil temperature (deg C)

| y/x | -40 | 40 | 60 | 80 | 90 | 100 | 120 | 130 | 140 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.58 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.00 |

# Initial Supporting table - P0521_RPM_Weighting_Factor - Single Stage Oil Pump

**Description:** Engine RPM Weighting Factor - Single Stage Oil Pump

**Value Units:** Weight factor for the given engine speed (none)
**X Unit:** Filtered engine speed (RPM)

| y/x | 0 | 500 | 900 | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.00 | 0.45 | 0.45 | 0.45 | 0.46 | 0.44 | 0.00 |

# Initial Supporting table - HPESFailCoeffA

**Description:** Cofficient Afor HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | -15 | 0 | -20 | -15 | -10 |

## Initial Supporting table - HPESFailCoeffB

**Description:** Cofficient B for HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 30 | 52 | 55 | 15 | 30 | 46 | 41 |

# Initial Supporting table - HPESFailCoeffC

**Description:** Cofficient B for HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 3,000 | -1,800 | 1,500 | 500 | -800 | -750 | 2,000 | 2,000 |

# Initial Supporting table - P0128 Maximum Acculated Energy - Primary

**Description:** KtETHD_E_EOR_WrmllpEnrgyLimTestO

**Value Units:** Cooling system energy failure threshold (kJ)
**X Unit:** Minimum ECT for the key cycle (°C)

| y/x | -20.0 | -7.0 | 10.0 | 30.0 | 45.0 | 60.0 | 75.0 |
|---|---|---|---|---|---|---|---|
| 1.0 | 18,623.2 | 18,623.2 | 18,623.2 | 14,299.8 | 11,057.2 | 7,814.7 | 4,572.1 |

# Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

**Description:** KtETHD_E_EOR_WrmllpEnrgyLimTest1

**Value Units:** Cooling system energy failure threshold (kJ)
**X Unit:** Minimum ECT for the key cycle (°C)

| y/x | -20.0 | -7.0 | 10.0 | 30.0 | 45.0 | 60.0 | 75.0 |
|---|---|---|---|---|---|---|---|
| 1.0 | 19,318.4 | 16,867.1 | 13,661.6 | 9,890.4 | 7,062.0 | 4,233.6 | 1,405.2 |

# Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

**Description:** KtETHD_E_EOR_WrmllpEnrgyLimTest2

**Value Units:** Cooling system energy failure threshold (kJ)
**X Unit:** Minimum ECT for the key cycle (°C)

| y/x | -20.0 | -7.0 | 10.0 | 30.0 | 45.0 | 60.0 | 75.0 |
|---|---|---|---|---|---|---|---|
| 1.0 | 19,318.4 | 16,867.1 | 13,661.6 | 9,890.4 | 7,062.0 | 4,233.6 | 1,405.2 |

## Initial Supporting table -P01F0N-Heat To Coolant Min 2D

**Description:** KtETHD_P_CDD_HeatToCoolantMin

**Value Units:** Indicated Power (kW)
**X Unit:** Firing Fraction
**Y Units:** Ambient temperature (°C)

| y/x | 0.29 | 0.33 | 0.50 | 0.75 | 1.00 |
|---|---|---|---|---|---|
| -9.0 | 255.0 | 10.8 | 13.6 | 11.8 | 15.7 |
| 0.0 | 255.0 | 10.8 | 13.6 | 11.8 | 15.7 |
| 10.0 | 255.0 | 7.4 | 8.1 | 7.7 | 15.5 |
| 30.0 | 255.0 | 7.4 | 8.1 | 7.7 | 15.5 |
| 50.0 | 255.0 | 7.4 | 8.1 | 7.7 | 15.5 |

# Initial Supporting table - P219A EWMA Coefficient

**Description:** The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio.

**Value Units:** Unitless Scalar
**X Unit:** Unitless Scalar

| y/x | -1.00 | -0.50 | 0.00 | 0.50 | 1.00 |
|---|---|---|---|---|---|
| 1 | 0.05 | 0.10 | 0.15 | 0.10 | 0.05 |

# Initial Supporting table - P219A EWMA Coefficient Opt Table

**Description:** The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio while in Optional Mode, if used.

**Value Units:** Unitless Scalar
**X Unit:** Unitless Scalar

| y/x | -1.00 | -0.50 | 0.00 | 0.50 | 1.00 |
|---|---|---|---|---|---|
| 1.0 | 0.10 | 0.20 | 0.50 | 0.20 | 0.10 |

## Initial Supporting table - P219A1 Quality Factor Bank1 Table

**Description:** Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for th ) current sample period

**Value Units:** Unitless Scalar
**X Unit:** Engine Speed (RPM)
**Y Units:** Air Per Cylinder (APC) (mg/cylinder)

| y/x | 800 | 1,020 | 1,240 | 1,460 | 1,680 | 1,900 | 2,120 | 2,340 | 2,560 | 2,780 | 3,000 | 3,220 | 3,440 | 3,660 | 3,880 | 4,100 | 4,320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 160 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 240 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 280 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 320 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 360 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 400 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 440 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 480 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 520 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 560 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 600 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 640 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 680 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 720 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 760 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# Initial Supporting table - P219B EWMA Coefficient

**Description:** The bank 2 EWMA coefficient used to filter the AFIM Variance Ratio.

**Value Units:** Unitless Scalar
**X Unit:** Unitless Scalar

| y/x | -1.00 | -0.50 | 0.00 | 0.50 | 1.00 |
|---|---|---|---|---|---|
| 1.0 | 0.05 | 0.10 | 0.15 | 0.10 | 0.05 |

# Initial Supporting table - P219B EWMA Coefficient Opt Mode

**Description:** The bank 2 EWMA coefficient used to filter the AFIM Variance Ratio while in Optional Mode, if used.

**Value Units:** Unitless Scalar
**X Unit:** Unitless Scalar

| y/x | -1.00 | -0.50 | 0.00 | 0.50 | 1.00 |
|---|---|---|---|---|---|
| 1.0 | 0.10 | 0.20 | 0.50 | 0.20 | 0.10 |

## Initial Supporting table -P219BI Quality Factor Bank2 Table

**Description:** Bank 2 lookup table of Quality Factors used in the calculation of the Ratio for th ) current sample period

**Value Units:** Unitless Scalar
**X Unit:** Engine Speed (RPM)
**Y Units:** Air Per Cylinder (APC) (mg/cylinder)

| y/x | 800 | 1,020 | 1,240 | 1,460 | 1,680 | 1,900 | 2,120 | 2,340 | 2,560 | 2,780 | 3,000 | 3,220 | 3,440 | 3,660 | 3,880 | 4,100 | 4,320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 160 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 240 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 280 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 320 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 360 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 400 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 440 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 480 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 520 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 560 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 600 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 640 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 680 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 720 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 760 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# Initial Supporting table - P2B86 Coolant Pump “A” Overspeed Fail Threshold

**Description:** Pump Overspeed failure threshold as a function of pump requested speed

**Value Units:** Pump overspeed failure threshold (RPM)
**X Unit:** Commanded pump speed (RPM)

| y/x | 0 | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,150 | 3,350 | 3,480 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -200 | -200 | -200 | -200 | -200 | -250 | -300 | -315 | -335 | -348 |

# Initial Supporting table - P2B86 Coolant Pump “A” Overspeed Fail Threshold Low Volatage

**Description:** Pump Overspeed failure threshold in a low voltage condition as a function of pump requested speed

**Value Units:** Pump overspeed failure threshold low voltage (RPM)
**X Unit:** Commanded pump speed (RPM)

| y/x | 0 | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,150 | 3,350 | 3,480 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -200 | -200 | -200 | -200 | -200 | -250 | -300 | -315 | -335 | -348 |

## Initial Supporting table - P0330_OpenCktThrshMax2 (20kHz)

**Description:** Max threshold table for the 20 KHz portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.949 | 9.000 | 9.029 | 9.020 | 8.988 | 8.920 | 8.828 | 8.699 | 8.549 | 8.359 | 8.148 | 7.898 | 7.629 | 7.318 | 6.988 | 6.619 | 6.229 |

## Initial Supporting table - P0330_OpenCktThrshMax2 (NN)

**Description:** Max threshold table for the Normal Noise for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

| y/x | 2,700 | 2,900 | 3,000 | 3,250 | 3,500 | 3,750 | 4,000 | 4,250 | 4,500 | 4,750 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

## Initial Supporting table - P0330_OpenCktThrshMin2 (20 kHz)

**Description:** Min threshold table for the Normal Noise portion of the open circuit diagnostic. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.689 | 2.760 | 2.809 | 2.840 | 2.850 | 2.840 | 2.809 | 2.760 | 2.689 | 2.600 | 2.488 | 2.359 | 2.209 | 2.039 | 1.850 | 1.639 | 1.408 |

## Initial Supporting table - P0330_OpenCktThrshMin2 (NN)

**Description:** Min threshold table for the Normal Noise portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold or the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

| y/x | 2,700 | 2,900 | 3,000 | 3,250 | 3,500 | 3,750 | 4,000 | 4,250 | 4,500 | 4,750 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

# Initial Supporting table - P0331_AbnormalLo2

**Description:** The low limit (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.060 | 0.060 | 0.060 | 0.060 | 0.060 | 0.069 | 0.149 | 0.239 | 0.340 | 0.449 | 0.569 | 0.699 | 0.840 | 0.840 | 0.840 | 0.840 | 0.840 |

# Initial Supporting table - P0331_AbnormalLoAFM_2

**Description:** The low limit for AFM mode (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.060 | 0.060 | 0.060 | 0.060 | 0.060 | 0.069 | 0.149 | 0.239 | 0.340 | 0.449 | 0.569 | 0.699 | 0.840 | 0.840 | 0.840 | 0.840 | 0.840 |

## Initial Supporting table - P06B7_OpenTestCktMax2

**Description:** Max threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.049 | 0.100 | 0.119 | 0.180 | 0.299 | 0.398 | 0.510 | 0.520 | 0.529 | 0.750 | 1.100 | 1.398 | 1.600 | 1.799 | 2.000 | 2.199 | 2.398 |

## Initial Supporting table - P06B7_OpenTestCktMin2

**Description:** Min threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 0.000 | 0.000 | 0.020 | 0.020 | 0.049 | 0.078 | 0.119 | 0.129 | 0.158 | 0.180 | 0.199 | 0.219 | 0.260 | 0.299 | 0.318 | 0.340 |

# Initial Supporting table - P0494_LIN_Threshold

**Description:** Tabulated LIN Fan1 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan1 Speed rpm
**Y Units:** Sensed LIN Fan1 Speed Lower Limit rpm

| y/x | 0 | 450 | 2,330 | 2,331 | 2,332 | 2,333 | 2,334 | 2,335 | 2,336 | 2,337 | 2,338 | 2,340 | 2,341 | 2,342 | 2,343 | 2,344 | 2,345 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 240 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 |

# Initial Supporting table - P2CB9_LIN_Threshold

**Description:** Tabulated LIN Fan2 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan2 Speed rpm
**Y Units:** Sensed LIN Fan2 Speed Lower Limit rpm

| y/x | 0 | 650 | 2,660 | 2,661 | 2,663 | 2,664 | 2,665 | 2,666 | 2,667 | 2,668 | 2,669 | 2,670 | 2,671 | 2,672 | 2,673 | 2,674 | 2,675 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 440 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 |

# Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - Deac MAP-CDC Threshold

**Description:** Fail to Deac - MAP and CDC Threshold Calibration

**Value Units:** kPa
**X Unit:** Consecutive Cylinder Deac Count (counts)
**Y Units:** Filtered Normalized MAP (kPa/kPa)

| y/x | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 |
|---|---|---|---|---|---|---|
| 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |
| 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |
| 0.85 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |
| 0.90 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |
| 0.95 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |
| 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | -1.50 | -1.50 |

# Initial Supporting table - F2Deac FF-CDC Threshold

**Description:**

**Value Units:** kPa
**X Unit:** Consecutive Cylinder Deac Count (counts)
**Y Units:** Firing Fraction (Active/Total)

| y/x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 0.0000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.1111 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.1250 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.1429 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.1667 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.2000 | -1.00 | -0.40 | -1.20 | -1.00 | 0.00 | 0.00 |
| 0.2222 | -1.25 | -0.60 | -1.00 | -1.00 | 0.00 | 0.00 |
| 0.2500 | -1.50 | -0.85 | -1.25 | 0.00 | 0.00 | 0.00 |
| 0.2857 | -1.10 | -1.25 | -1.00 | 0.00 | 0.00 | 0.00 |
| 0.3333 | -0.50 | -0.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.3750 | -0.90 | -0.30 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.4000 | -1.00 | -0.15 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.4286 | -1.00 | -1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.4444 | -1.00 | -1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.5000 | -0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.5556 | -0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.5714 | -0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.6000 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.6250 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.6667 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.7143 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.7500 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.7778 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.8000 | 0.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.8333 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.8571 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.8750 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.8889 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.0000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# Initial Supporting table - HPESFailCoeffA

**Description:** Cofficient Afor HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | -15 | 0 | -20 | -15 | -10 |

## Initial Supporting table - HPESFailCoeffB

**Description:** Cofficient B for HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 30 | 52 | 55 | 15 | 30 | 46 | 41 |

# Initial Supporting table - HPESFailCoeffC

**Description:** Cofficient B for HPES diagnostic failure threshold.

**Value Units:** None
**X Unit:** Fire skip status (none)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 3,000 | -1,800 | 1,500 | 500 | -800 | -750 | 2,000 | 2,000 |

# Initial Supporting table - P0494_LIN_Threshold

**Description:** Tabulated LIN Fan1 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan1 Speed rpm
**Y Units:** Sensed LIN Fan1 Speed Lower Limit rpm

| y/x | 0 | 450 | 2,330 | 2,331 | 2,332 | 2,333 | 2,334 | 2,335 | 2,336 | 2,337 | 2,338 | 2,340 | 2,341 | 2,342 | 2,343 | 2,344 | 2,345 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 240 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 |

## Initial Supporting table - P129F Threshold High

**Description:** P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

**Value Units:** revs / min
**X Unit:** revs / min [commanded pump speed]
**Y Units:** kiloPascals [requested fuel pressure]

| y/x | 200.0 | 300.0 | 400.0 | 500.0 | 600.0 |
|---|---|---|---|---|---|
| 1,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 2,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 3,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 4,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 5,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 6,000.0 | -675.0 | -675.0 | -675.0 | -675.0 | -675.0 |
| 7,000.0 | -1,200.0 | -1,200.0 | -1,200.0 | -1,200.0 | -1,200.0 |

## Initial Supporting table - P>129F Threshold Low

**Description:** P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

**Value Units:** revs / min
**X Unit:** revs / min [commanded pump speed]
**Y Units:** kiloPascals [requested fuel pressure]

| y/x | 200.0 | 300.0 | 400.0 | 500.0 | 600.0 |
|---|---|---|---|---|---|
| 1,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 2,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 3,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 4,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 5,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 6,000.0 | 675.0 | 675.0 | 675.0 | 675.0 | 675.0 |
| 7,000.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |

# Initial Supporting table - P2CB9_LIN_Threshold

**Description:** Tabulated LIN Fan2 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan2 Speed rpm
**Y Units:** Sensed LIN Fan2 Speed Lower Limit rpm

| y/x | 0 | 650 | 2,660 | 2,661 | 2,663 | 2,664 | 2,665 | 2,666 | 2,667 | 2,668 | 2,669 | 2,670 | 2,671 | 2,672 | 2,673 | 2,674 | 2,675 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 440 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 |

# Initial Supporting table - P3187_Threshold

**Description:** P3187 Filtered Fuel Pressure Error Threshold [under-performing pump]

**Value Units:** kilo Pascals
**X Unit:** kPa [commanded fuel pressure]
**Y Units:** grams / sec [fuel flow]

| y/x | 200.00 | 250.00 | 300.00 | 350.00 | 400.00 | 450.00 | 500.00 | 550.00 | 600.00 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 1.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 3.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 4.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 6.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 7.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 9.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 10.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 12.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 13.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 15.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 16.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 18.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 19.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 21.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 22.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 24.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 25.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 27.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 28.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 30.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 31.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 33.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 34.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 36.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 37.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 39.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 40.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 42.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 43.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 45.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |

Initial Supporting table • P3187_Threshold

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 46.50 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |
| 48.00 | 30.00 | 37.50 | 45.00 | 52.50 | 60.00 | 67.50 | 75.00 | 82.50 | 90.00 |

# Initial Supporting table - P3188_Threshold

**Description:** P3188 Filtered Fuel Pressure Error Threshold [over-performing pump]

**Value Units:** kilo pascals [kPa]
**X Unit:** kPa [commanded fuel pressure]
**Y Units:** grams/sec [fuel flow]

| y/x | 200.00 | 250.00 | 300.00 | 350.00 | 400.00 | 450.00 | 500.00 | 550.00 | 600.00 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 1.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 3.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 4.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 6.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 7.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 9.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 10.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 12.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 13.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 15.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 16.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 18.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 19.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 21.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 22.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 24.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 25.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 27.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 28.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 30.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 31.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 33.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 34.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 36.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 37.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 39.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 40.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 42.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 43.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 45.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |

**Initial Supporting table • P3188_Threshold**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 46.50 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |
| 48.00 | -490.00 | -440.00 | -390.00 | -340.00 | -290.00 | -240.00 | -190.00 | -140.00 | -90.00 |

# Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - DFCO Active Maximum Time (seconds)

**Description:** DFCO active maximum time versus engine airflow (gps)

**Value Units:** Time (seconds)
**X Unit:** Engine airflow (gps)

| y/x | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 30 | 35 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

# Initial Supporting table - DFCO Active Minimum Time (seconds)

**Description:** DFCO active minimum time versus engine airflow (gps)

**Value Units:** Time (seconds)
**X Unit:** Engine airflow (gps)

| y/x | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 30 | 35 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

# Initial Supporting table - Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests

**Description:** This table describes the adaptive (Block Learn) cells in which to enable the Post (Secondary) Oxygen sensor response tests.
Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

The cell numbers in the table are defined as:

CeFADR_e_CellOO_PurgOnAirMode5= 0,
CeFADR_e_Cell01_PurgOnAirMode4 = 1,
CeFADR_e_Cell02_PurgOnAirMode3 = 2,
CeFADR_e_Cell03_PurgOnAirMode2 = 3,
CeFADR_e_Cell04_PurgOnAirMode1 = 4,
CeFADR_e_Cell05_PurgOnAirModeO= 5,
CeFADR_e_Cell06_PurgOnIdle = 6,
CeFADR_e_Cell07_PurgOnDecel = 7,
CeFADR_e_Cell08_PurgOffAirMode5 = 8,
CeFADR_e_Cell09_PurgOffAirMode4 = 9,
CeFADR_e_Cell10_PurgOffAirMode3 = 10,
CeFADR_e_Cell11_PurgOffAirMode2 = 11,
CeFADR_e_Cell12_PurgOffAirModeI = 12,
CeFADR_e_Cell13_PurgOffAirModeO= 13,
CeFADR_e_Cell14_PurgOffIdle = 14,
CeFADR_e_Cell15_PurgOffDecel = 15

**Value Units:** Block Learn cell number
**X Unit:** Block Learn cell number

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

# Initial Supporting table - Multiple DTC Use  Green Sensor Delay Criteria - Limit

**Description:** This Calibration is the acculmulated airflow limit above which the Green condition is expired
Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273.
Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.

**Value Units:** Grams
**X Unit:** Acculmulated Engine Airflow

| y/x | CiOXYR_O2_Bank1_Sensor1 | CiOXYR_O2_Bank1_Sensor2 | CiOXYR_O2_Bank2_Sensor1 | CiOXYR_O2_Bank2_Sensor2 |
|---|---|---|---|---|
| 1 | 120,000 | 120,000 | 120,000 | 120,000 |

## Initial Supporting table - POOJI1_CamPosErrorLimIc1

**Description:** Maximum Intake Cam 1 phase error as a function of engine speed and engine oil temperature.

**Value Units:** Maximum Intake Cam 1 phase error (degCAM)
**X Unit:** Engine Oil Temperature (degC)
**Y Units:** Engine Speed (rpm)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 800 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 1,200 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 1,600 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 2,000 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 2,400 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 2,800 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 3,200 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 3,600 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 4,000 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 4,400 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 4,800 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 5,200 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 5,600 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 6,000 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 6,400 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 6,800 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnbllc

**Description:** Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

**Value Units:** Time (sec)
**X Unit:** Engine Coolant Temperature (degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 8 | 8 | 6 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

**Description:** Minimum engine speed to disable Intake cam

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnbllc

**Description:** Maximum engine speed to enable Intake cam - works as hysteresis.

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 | 6,800 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnbllc

**Description:** Intake cam is enabled when oil pressure exceeds this value

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsbllc

**Description:** Intake cam is disabled when oil pressure falls below this value

**Value Units:** Engine Oil Pressure (kPa)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 170 | 170 | 170 | 170 | 160 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 160 | 170 | 170 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnbllc

**Description:** Intake cam is enabled when engine speed exceeds this value.

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 900 | 900 | 800 | 800 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 800 | 800 | 800 |

# Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsbllc

**Description:** Intake cam is disabled when engine speed is below this value.

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp (degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 750 | 750 | 700 | 700 | 650 | 650 | 650 | 650 | 650 | 650 | 650 | 650 | 650 | 650 | 700 | 700 | 700 |

## Initial Supporting table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

**Description:** Engine running time must be greater than this threshold during a cold start to enable cam phasing

**Value Units:** Time (sec)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 4 | 4 | 4 | 4 |

## Initial Supporting table - P0011_P(0)5CC_StablePositionTimeIc1

**Description:** Minimum time for Intake Cam 1 phase position to be stable to enable performance diagnostic.

**Value Units:** Minimum time (sec)
**X Unit:** Engine Oil Temperature (degC)
**Y Units:** Engine Speed (rpm)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 800 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 1,200 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 1,600 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 2,000 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 2,400 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 2,800 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 3,200 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 3,600 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 4,000 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 4,400 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 4,800 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 5,200 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 5,600 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 6,000 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 6,400 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 6,800 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

**Description:** Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

**Value Units:** Time (sec)
**X Unit:** Engine Coolant Temperature (degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

**Description:** Exhaust cam is disabled when engine speed exceeds this value

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

**Description:** Exhaust cam is enabled when engine speed remains below this value

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

**Description:** Exhaust cam is enabled when oil pressure exceeds this value

**Value Units:** Engine Oil Pressure (kPa)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

**Description:** Exhaust cam is disabled when oil pressure falls below this value

**Value Units:** Engine Oil Pressure (kPa)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

**Description:** Exhaust cam is enabled when engine speed exceeds this value.

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 900 | 900 | 800 | 800 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 800 | 800 | 800 |

# Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc

**Description:** Exhaust cam is disabled when engine speed is below this value.

**Value Units:** Engine Speed (rpm)
**X Unit:** Engine Oil Temp(degC)

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |

# Initial Supporting table - P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

**Description:** P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

**Value Units:** Engine Run Time- Seconds
**X Unit:** Oil Temperature- C

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.0 | 10.0 | 7.0 | 5.0 | 3.0 | 7.0 | 5.0 | 5.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |

# Initial Supporting table - P0016-0019 Mid-Park Phaser Delay

**Description:** P0016-0019 Mid-Park Phaser Park Delay. Total delay is twice the calibration value as both 'hi' side and 'lo' side park check sequences are delayed by the stated calibration values

**Value Units:** Time - seconds
**X Unit:** Oil Temperature - degC

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.0 | 20.0 | 8.0 | 2.0 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

# Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

**Description:** OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

**Value Units:** Counter Increment Value (Unitless)
**X Unit:** Vehicle Speed (KPH)

| y/x | 0.0 | 20.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105.0 | 120.0 |
|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 0.0 | 4.0 | 6.0 | 6.8 | 7.3 | 7.8 | 8.0 | 8.0 | 8.0 |

# Initial Supporting table -P0071:OAT Perfornlance Drive Equilibrium Engine Running

**Description:** OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

**Value Units:** Counter Increment Value (Unitless)
**X Unit:** Vehicle Speed (KPH)
**Y Units:** Engine Air Flow (Grams/Second)

| y/x | 0.0 | 20.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105.0 | 120.0 |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 15.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 25.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 35.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 45.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 55.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 65.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 75.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| 85.0 | -0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |

# Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM

**Description:** P0101_P0106_P0121_P012B_P0236_P1101 MAPI Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)
**X Unit:** Engine Speed (RPM)

| y/x | 0 | 400 | 750 | 1,100 | 1,450 | 1,800 | 2,150 | 2,500 | 2,850 | 3,200 | 3,550 | 3,900 | 4,250 | 4,600 | 4,950 | 5,300 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

# Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM

**Description:** P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)
**X Unit:** Engine Speed (RPM)

| y/x | 0 | 400 | 750 | 1,100 | 1,450 | 1,800 | 2,150 | 2,500 | 2,850 | 3,200 | 3,550 | 3,900 | 4,250 | 4,600 | 4,950 | 5,300 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.750 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

# Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM

**Description:** P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)
**X Unit:** Engine Speed (RPM)

| y/x | 0 | 400 | 750 | 1,100 | 1,450 | 1,800 | 2,150 | 2,500 | 2,850 | 3,200 | 3,550 | 3,900 | 4,250 | 4,600 | 4,950 | 5,300 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.000 | 0.500 | 0.670 | 0.750 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

## Initial Supporting table - P050D_P1400_CatalystI_ightOffExtendedEngineRunTimeExit

**Description:** Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

| y/x | 0 | 25 | 50 | 75 | 100 |
|---|---|---|---|---|---|
| 0.000 | 33 | 33 | 33 | 33 | 33 |
| 0.125 | 33 | 33 | 33 | 33 | 33 |
| 0.250 | 33 | 33 | 33 | 33 | 33 |
| 0.375 | 33 | 33 | 33 | 33 | 33 |
| 0.500 | 18 | 18 | 18 | 18 | 18 |
| 0.625 | 18 | 18 | 18 | 18 | 18 |
| 0.750 | 18 | 18 | 18 | 18 | 18 |
| 0.875 | 18 | 18 | 18 | 18 | 18 |
| 1.000 | 18 | 18 | 18 | 18 | 18 |

## Initial Supporting table - P1400_CatalystLightOffExtendedEngineRunTimeExit

**Description:** Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

| y/x | 0 | 25 | 50 | 75 | 100 |
|---|---|---|---|---|---|
| 0.000 | 33 | 33 | 33 | 33 | 33 |
| 0.125 | 33 | 33 | 33 | 33 | 33 |
| 0.250 | 33 | 33 | 33 | 33 | 33 |
| 0.375 | 33 | 33 | 33 | 33 | 33 |
| 0.500 | 18 | 18 | 18 | 18 | 18 |
| 0.625 | 18 | 18 | 18 | 18 | 18 |
| 0.750 | 18 | 18 | 18 | 18 | 18 |
| 0.875 | 18 | 18 | 18 | 18 | 18 |
| 1.000 | 18 | 18 | 18 | 18 | 18 |

## Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime

**Description:** Quality weight-based on engine run time. This allows adjustment of the weighting factors at various engine run times in order to prevent the updating of the cumulative quality timer or to change the value of the average qualified residual energy calculation to prevent false Fails of the diagnostic under circumstances inappropriate to update the calculation of the average qualified residual value.

| y/x | 0 | 3 | 3 | 4 | 5 | 10 | 15 | 20 | 30 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

**Description:** This is the x-axis for the KtCSED_K_TimeWght calibration table. Refer to the description for KtCSED_K_TimeWghtfor details.

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3 | 3 | 4 | 5 | 10 | 15 | 20 | 30 |

# Initial Supporting table - P1400_EngineSpeedResidual_Table

**Description:** This 1x17 table of engine exhaust flow values is used to calculate both the desired and the actual engine exhaust flow based on desired and actual engine speed. The desired engine exhaust flow is gathered from the desired engine speed (VeSPDR_n_EngDsrd). The value used for the actual engine exhaust flow is based on the actual engine RPM value.

| y/x | 600 | 725 | 800 | 850 | 900 | 1,050 | 1,100 | 1,125 | 1,140 | 1,160 | 1,180 | 1,200 | 1,250 | 1,275 | 1,300 | 1,500 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 4 | 5 | 5 | 5 | 5 | 7 | 8 | 10 | 11 | 11 | 12 | 12 | 12 | 12 | 12 |

# Initial Supporting table - P1400_SparkResidual_Table

**Description:** Predicted engine-out energy potential based on either the desired cold start spark advance value or the actual spark advance value. ExhEngyPerlInitMass calibration is used to calculate both desired exhaust energy and actual energy. The desired and actual exhaust energy per unit mass values are used in part to calculate the desired exhaust energy per unit time and actual exhaust energy per unit time. Both desired and actual go into the residual exhaust energy per unit time calculation.

| y/x | -20 | -15 | -10 | -7 | -5 | -3 | 5 | 10 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.13 | 1.13 | 1.13 | 1.06 | 1.00 | 1.00 | 0.75 | 0.63 | 0.63 |

# Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est

**Description:** P0101_P0106_P010B_P01 21_P012B_P0236__P1101 MAF1 Residual Weight Factor based on MAF Est

**Value Units:** Weight Factor (Unitless)
**X Unit:** Estimated Engine Air Flow (Grams/Second)

| y/x | 0 | 50 | 70 | 73 | 76 | 79 | 82 | 85 | 89 | 95 | 100 | 110 | 120 | 150 | 200 | 280 | 350 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

## Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM

**Description:** P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)
**X Unit:** Engine Speed (RPM)

| y/x | 0 | 400 | 750 | 1,100 | 1,450 | 1,800 | 2,150 | 2,500 | 2,850 | 3,200 | 3,550 | 3,900 | 4,250 | 4,600 | 4,950 | 5,300 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.900 | 0.800 | 0.800 | 0.800 | 0.750 | 0.700 | 0.600 |

# Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

**P0606_Last Seed Timeout f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR e 1 2p5ms Seq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 |

**P0606_Last Seed Timeout f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 500.000 | 500.000 | 1,000.000 | 2,500.000 | 8,191.875 | 8,191.875 | 8,191.875 |

# Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

**P0606_PSW Sequence Fail f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR e 1 2p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 3 | 5 | 3 | 5 | 3 |

**P0606_PSW Sequence Fail f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 5 |

# Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

**P0606_PSW Sequence Sample f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR e 1 2p5ms Seq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**P0606_PSW Sequence Sample f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**Initial Supporting table - 1st_FireAftrMisfr_Accel**

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 0.64 | 0.64 | 0.64 | 0.64 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| 12 | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| 16 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.57 | 0.58 | 0.60 | 0.63 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| 20 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.44 | 0.47 | 0.50 | 0.58 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| 24 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.36 | 0.41 | 0.47 | 0.56 | 0.63 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| 30 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.29 | 0.38 | 0.47 | 0.53 | 0.57 | 0.56 | 0.58 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |
| 40 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.23 | 0.37 | 0.50 | 0.47 | 0.46 | 0.50 | 0.55 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| 60 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.23 | 0.37 | 0.50 | 0.47 | 0.46 | 0.50 | 0.55 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| 100 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.23 | 0.37 | 0.50 | 0.47 | 0.46 | 0.50 | 0.55 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |

## Initial Supporting table - 11et_FireAftrMisfr_Jerk

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylirider after the misfire

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | -0.63 | -0.63 | -0.63 | -0.63 | -0.50 | -0.55 | -0.59 | -0.64 | -0.68 | -0.69 | -0.62 | -0.56 | -0.50 | -0.50 | -0.50 | -0.50 | -0.50 |
| 12 | -0.63 | -0.63 | -0.63 | -0.63 | -0.63 | -0.64 | -0.66 | -0.67 | -0.66 | -0.71 | -0.77 | -0.75 | -0.71 | -0.71 | -0.71 | -0.71 | -0.71 |
| 16 | -0.83 | -0.83 | -0.83 | -0.83 | -0.83 | -0.80 | -0.77 | -0.74 | -0.65 | -0.75 | -0.93 | -0.93 | -0.93 | -0.93 | -0.93 | -0.93 | -0.93 |
| 20 | -1.00 | -1.00 | -1.00 | -1.00 | -1.00 | -0.94 | -0.87 | -0.81 | -0.69 | -0.75 | -0.92 | -0.92 | -0.92 | -0.92 | -0.92 | -0.92 | -0.92 |
| 24 | -1.21 | -1.21 | -1.21 | -1.21 | -1.21 | -1.05 | -0.90 | -0.74 | -0.64 | -0.73 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 |
| 30 | -1.32 | -1.32 | -1.32 | -1.32 | -1.32 | -1.14 | -0.95 | -0.76 | -0.67 | -0.74 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 | -0.91 |
| 40 | -1.33 | -1.33 | -1.33 | -1.33 | -1.33 | -1.19 | -1.06 | -0.92 | -0.79 | -0.78 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 |
| 60 | -1.33 | -1.33 | -1.33 | -1.33 | -1.33 | -1.19 | -1.06 | -0.92 | -0.79 | -0.78 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 |
| 100 | -1.33 | -1.33 | -1.33 | -1.33 | -1.33 | -1.19 | -1.06 | -0.92 | -0.79 | -0.78 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 | -0.90 |

# Initial Supporting table - IstFireAfterMisJerkAFM

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 24 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 30 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 40 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - IstFireAftrMisAcelAFM

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 24 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 30 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 40 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Abnormal Cyl Mode

**Description:** Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

**Value Units:** Number of consecutive number of decelerating cylinders (integer)
**X Unit:** thousands of RPM (rpm/1000)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

# Initial Supporting table - Abnormal Rev Mode

**Description:** Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

**Value Units:** Number of consecutive number of decelerating cylinders (integer)
**X Unit:** thousands of RPM (rpm/1000)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |

# Initial Supporting table - Abnormal SCD Mode

**Description:** Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

**Value Units:** Number of consecutive number of decelerating cylinders (integer)
**X Unit:** thousands of RPM (rpm/1000)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

## Initial Supporting table ■Bank_SCD_Decel

**Description:** Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 12 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 16 | 0.75 | 0.69 | 0.75 | 0.75 | 0.75 | 0.73 | 0.71 | 0.75 | 0.75 |
| 18 | 0.75 | 0.60 | 0.70 | 0.62 | 0.67 | 0.67 | 0.65 | 0.69 | 0.54 |
| 20 | 0.75 | 0.64 | 0.75 | 0.75 | 0.75 | 0.70 | 0.71 | 0.75 | 0.67 |
| 24 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 30 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 40 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 60 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 98 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

# Initial Supporting table - Bank_SCD_Jerk

**Description:** Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pettern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** mulitplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 18 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - BankCylModeDecel

**Description:** Used for P0300 - P0308, Mulitplier to Lores Decel to account for different patterni of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| 16 | 0.61 | 0.56 | 0.52 | 0.50 | 0.47 | 0.38 | 0.29 | 0.28 | 0.27 | 0.25 | 0.25 | 0.33 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| 18 | 0.42 | 0.52 | 0.63 | 0.57 | 0.51 | 0.47 | 0.43 | 0.38 | 0.27 | 0.40 | 0.36 | 0.25 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| 20 | 0.54 | 0.54 | 0.54 | 0.54 | 0.55 | 0.53 | 0.52 | 0.45 | 0.31 | 0.30 | 0.32 | 0.36 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 |
| 24 | 0.58 | 0.60 | 0.62 | 0.56 | 0.49 | 0.50 | 0.51 | 0.43 | 0.26 | 0.26 | 0.33 | 0.40 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 |
| 30 | 0.60 | 0.62 | 0.64 | 0.67 | 0.70 | 0.57 | 0.43 | 0.38 | 0.27 | 0.25 | 0.28 | 0.32 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| 40 | 0.52 | 0.55 | 0.58 | 0.56 | 0.53 | 0.45 | 0.37 | 0.35 | 0.32 | 0.35 | 0.35 | 0.39 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| 60 | 0.40 | 0.43 | 0.46 | 0.42 | 0.38 | 0.38 | 0.37 | 0.35 | 0.30 | 0.28 | 0.32 | 0.33 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 |
| 98 | 0.39 | 0.36 | 0.34 | 0.30 | 0.26 | 0.29 | 0.32 | 0.31 | 0.28 | 0.25 | 0.31 | 0.28 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 |

## Initial Supporting table [redacted]BankCylModeJerk

**Description:** Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.94 | 0.96 | 1.00 | 0.88 | 0.94 | 0.90 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |
| 18 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.94 | 0.89 | 0.93 | 1.00 | 0.70 | 1.00 | 0.70 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 0.91 | 0.95 | 1.00 | 1.00 | 1.00 | 0.94 | 0.88 | 0.86 | 0.83 | 0.81 | 0.83 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 0.80 | 0.88 | 0.95 | 0.96 | 0.97 | 1.00 | 1.03 | 0.92 | 0.70 | 0.70 | 0.76 | 0.83 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| 30 | 0.71 | 0.78 | 0.86 | 0.86 | 0.87 | 0.93 | 0.99 | 0.89 | 0.70 | 0.70 | 0.74 | 0.70 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.72 | 0.74 | 0.73 | 0.70 | 0.70 | 0.70 | 0.70 | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 |
| 60 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| 98 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |

# Initial Supporting table - Catalyst_Damage_Misfire_Percentage

**Description:** Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

**Value Units:** percent misfire over 200 revolutions (%)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 0 | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|
| 0 | 11.2 | 11.2 | 11.2 | 5.6 | 4.8 | 4.8 | 4.8 | 4.8 |
| 10 | 11.2 | 11.2 | 11.2 | 5.6 | 4.8 | 4.8 | 4.8 | 4.8 |
| 20 | 11.2 | 11.2 | 11.2 | 5.6 | 4.8 | 4.8 | 4.8 | 4.8 |
| 30 | 5.6 | 5.6 | 5.6 | 5.6 | 4.8 | 4.8 | 4.8 | 4.8 |
| 40 | 5.6 | 5.6 | 5.6 | 5.6 | 4.8 | 4.8 | 4.8 | 4.8 |
| 50 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 60 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 70 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 80 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 90 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 100 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

# Initial Supporting table - ClyAfterAFM_Decel

**Description:** Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Initial Supporting table - FlyBeforeAFM_Jerk

**Description:** Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - CombustModeIdleTbl

**Description:** Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

**Value Units:** Enumerated value of different combustion modes (enumeration)
**X Unit:** Current Combustion Mode (enumeration)

| **CombustModeIdleTbl - Part 1** | | | | | | |
|---|---|---|---|---|---|---|
| y/x | 0 | 1 | 2 | 3 | 4 | 5 |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax |

| **CombustModeIdleTbl - Part 2** | | | | | | |
|---|---|---|---|---|---|---|
| y/x | 6 | 7 | 8 | 9 | 10 | 11 |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax |

| **CombustModeIdleTbl - Part 3** | | | | | | |
|---|---|---|---|---|---|---|
| y/x | 12 | 13 | 14 | 15 | 16 | |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | |

## Initial Supporting table - PonsecCylModDecel

**Description:** Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - ConsecCylModeJerk

**Description:** Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 |
| 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - ConsecSCD_Decel

**Description:** Used for P0300 - P0308, Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Initial Supporting table ■ConsecSCD_Jerk

**Description:** Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.23 |
| 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.15 | -0.20 |
| 24 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| 30 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| 40 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| 60 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| 98 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |

# Initial Supporting table - CylAfterAFM Jerk

**Description:** Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 24 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 30 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 40 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 98 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## Initial Supporting table - CylBeforeAFM_Decel

**Description:** Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - CylModeDecel

**Description:** Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

**CylModeDecel - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2,015 | 1,550 | 650 | 410 | 320 | 240 | 165 | 135 | 115 | 65 | 38 | 28 | 20 |
| 6 | 1,820 | 1,400 | 625 | 400 | 315 | 230 | 160 | 130 | 110 | 64 | 37 | 28 | 20 |
| 8 | 1,625 | 1,250 | 625 | 400 | 310 | 230 | 150 | 130 | 110 | 64 | 37 | 28 | 20 |
| 10 | 1,885 | 1,450 | 800 | 450 | 330 | 220 | 170 | 130 | 110 | 63 | 40 | 28 | 21 |
| 12 | 2,080 | 1,600 | 950 | 575 | 370 | 265 | 200 | 135 | 100 | 63 | 40 | 28 | 24 |
| 14 | 2,340 | 1,800 | 1,100 | 700 | 470 | 300 | 230 | 180 | 120 | 75 | 50 | 37 | 27 |
| 16 | 2,730 | 2,100 | 1,300 | 850 | 570 | 400 | 310 | 220 | 150 | 90 | 70 | 43 | 30 |
| 18 | 2,990 | 2,300 | 1,400 | 900 | 650 | 450 | 350 | 250 | 175 | 115 | 80 | 52 | 40 |
| 20 | 3,120 | 2,400 | 1,500 | 975 | 700 | 525 | 400 | 280 | 180 | 123 | 85 | 60 | 45 |
| 22 | 3,510 | 2,700 | 1,600 | 1,025 | 725 | 570 | 450 | 300 | 210 | 135 | 95 | 70 | 52 |
| 24 | 3,770 | 2,900 | 1,700 | 1,100 | 775 | 660 | 500 | 350 | 240 | 145 | 110 | 75 | 55 |
| 26 | 4,030 | 3,100 | 1,800 | 1,175 | 800 | 700 | 575 | 370 | 260 | 155 | 120 | 85 | 62 |
| 30 | 5,200 | 4,000 | 2,100 | 1,250 | 900 | 750 | 650 | 440 | 320 | 180 | 130 | 95 | 70 |
| 40 | 6,500 | 5,000 | 2,500 | 1,450 | 1,100 | 950 | 745 | 540 | 425 | 260 | 180 | 130 | 95 |
| 60 | 9,100 | 7,000 | 3,500 | 2,067 | 1,400 | 1,300 | 1,118 | 811 | 638 | 380 | 265 | 195 | 135 |
| 78 | 11,700 | 9,000 | 4,500 | 2,500 | 1,750 | 1,525 | 1,444 | 1,047 | 825 | 500 | 350 | 252 | 183 |
| 97 | 15,600 | 12,000 | 6,000 | 3,100 | 2,100 | 1,900 | 1,817 | 1,318 | 1,038 | 640 | 442 | 317 | 230 |

**CylModeDecel - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 16 | 14 | 13 | 11 | 9 | 11 | 7 | 5 | 7 | 6 | 6 | 5 | 5 |
| 6 | 14 | 12 | 12 | 10 | 8 | 11 | 7 | 5 | 7 | 6 | 6 | 4 | 4 |
| 8 | 13 | 11 | 11 | 9 | 8 | 11 | 7 | 5 | 7 | 6 | 6 | 4 | 4 |
| 10 | 16 | 13 | 11 | 8 | 8 | 11 | 7 | 5 | 7 | 6 | 6 | 4 | 4 |
| 12 | 19 | 14 | 10 | 9 | 8 | 7 | 5 | 4 | 7 | 6 | 6 | 4 | 4 |
| 14 | 20 | 16 | 11 | 9 | 8 | 8 | 5 | 4 | 7 | 6 | 6 | 4 | 4 |
| 16 | 25 | 19 | 15 | 12 | 10 | 8 | 5 | 4 | 7 | 5 | 5 | 4 | 4 |
| 18 | 30 | 23 | 17 | 14 | 11 | 8 | 6 | 4 | 7 | 5 | 5 | 4 | 4 |
| 20 | 33 | 27 | 19 | 16 | 12 | 10 | 7 | 5 | 7 | 5 | 5 | 4 | 4 |
| 22 | 36 | 30 | 22 | 17 | 14 | 13 | 8 | 5 | 7 | 6 | 6 | 4 | 4 |
| 24 | 40 | 32 | 24 | 19 | 15 | 14 | 9 | 5 | 7 | 6 | 6 | 4 | 4 |

## Initial Supporting table - CylModeDecel

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 43 | 35 | 26 | 21 | 17 | 15 | 10 | 6 | 7 | 6 | 6 | 4 | 4 |
| 30 | 50 | 40 | 30 | 25 | 20 | 16 | 12 | 7 | 6 | 6 | 6 | 4 | 4 |
| 40 | 72 | 50 | 42 | 32 | 25 | 23 | 16 | 9 | 6 | 6 | 6 | 5 | 5 |
| 60 | 100 | 83 | 60 | 50 | 37 | 25 | 20 | 10 | 7 | 6 | 6 | 5 | 5 |
| 78 | 141 | 107 | 79 | 65 | 54 | 32 | 24 | 15 | 9 | 7 | 7 | 7 | 7 |
| 97 | 177 | 135 | 100 | 81 | 68 | 36 | 28 | 17 | 11 | 8 | 8 | 8 | 8 |

# Initial Supporting table - CylModeJerk

**Description:** Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

**Value Units:** Change in Delta time per cylinder from last cylinder (usee)
**Y Units:** percent load of max indicated torque (%)

**CylModeJerk - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2,015 | 1,550 | 650 | 335 | 250 | 220 | 165 | 120 | 115 | 54 | 38 | 25 | 16 |
| 6 | 1,820 | 1,400 | 550 | 325 | 240 | 190 | 140 | 110 | 100 | 50 | 35 | 24 | 16 |
| 8 | 1,495 | 1,150 | 575 | 370 | 270 | 190 | 140 | 110 | 90 | 48 | 30 | 22 | 14 |
| 10 | 1,885 | 1,450 | 770 | 425 | 310 | 200 | 150 | 115 | 85 | 54 | 32 | 23 | 16 |
| 12 | 2,080 | 1,600 | 950 | 550 | 360 | 260 | 200 | 125 | 90 | 57 | 34 | 26 | 18 |
| 14 | 2,340 | 1,800 | 1,100 | 700 | 470 | 300 | 230 | 180 | 110 | 70 | 45 | 32 | 23 |
| 16 | 2,730 | 2,100 | 1,300 | 850 | 570 | 400 | 310 | 220 | 140 | 90 | 60 | 39 | 28 |
| 18 | 2,990 | 2,300 | 1,400 | 900 | 650 | 450 | 350 | 250 | 165 | 100 | 70 | 48 | 38 |
| 20 | 3,120 | 2,400 | 1,500 | 975 | 700 | 525 | 400 | 280 | 170 | 105 | 80 | 55 | 40 |
| 22 | 3,510 | 2,700 | 1,600 | 1,025 | 725 | 570 | 450 | 300 | 190 | 120 | 85 | 68 | 48 |
| 24 | 3,770 | 2,900 | 1,700 | 1,100 | 775 | 660 | 500 | 350 | 230 | 135 | 100 | 70 | 50 |
| 26 | 4,030 | 3,100 | 1,800 | 1,175 | 800 | 700 | 575 | 370 | 250 | 145 | 110 | 80 | 58 |
| 30 | 5,200 | 4,000 | 2,100 | 1,250 | 900 | 750 | 650 | 440 | 315 | 170 | 120 | 90 | 68 |
| 40 | 6,500 | 5,000 | 2,500 | 1,450 | 1,100 | 950 | 745 | 540 | 420 | 260 | 170 | 125 | 90 |
| 60 | 9,100 | 7,000 | 3,500 | 2,067 | 1,400 | 1,300 | 1,118 | 811 | 574 | 380 | 265 | 195 | 135 |
| 78 | 11,700 | 9,000 | 4,500 | 2,590 | 1,750 | 1,525 | 1,444 | 1,047 | 742 | 500 | 350 | 252 | 183 |
| 97 | 15,600 | 12,000 | 6,000 | 3,100 | 2,100 | 1,900 | 1,817 | 1,318 | 933 | 640 | 442 | 317 | 230 |

**CylModeJerk - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 16 | 11 | 10 | 9 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 14 | 10 | 9 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 11 | 10 | 8 | 7 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 14 | 10 | 6 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 15 | 11 | 7 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 18 | 14 | 9 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 23 | 17 | 13 | 11 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 28 | 21 | 15 | 12 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 31 | 25 | 17 | 13 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 34 | 28 | 20 | 16 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 38 | 30 | 21 | 16 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Initial Supporting table - CylModeJerk

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 41 | 33 | 23 | 18 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 48 | 38 | 28 | 23 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 70 | 50 | 40 | 30 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 100 | 83 | 58 | 48 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 78 | 141 | 107 | 79 | 65 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 97 | 177 | 135 | 100 | 81 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Initial Supporting table - DeacCylInversionDecel

**Description:** Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 30 | 10 | 5 | 3 | 3 | 3 | 3 | 3 | 3 |
| 12 | 30 | 15 | 5 | 3 | 3 | 3 | 3 | 3 | 3 |
| 16 | 30 | 15 | 8 | 3 | 3 | 3 | 3 | 3 | 3 |
| 20 | 125 | 55 | 25 | 3 | 3 | 3 | 3 | 3 | 3 |
| 24 | 175 | 100 | 50 | 3 | 3 | 3 | 3 | 3 | 3 |
| 30 | 275 | 150 | 75 | 14 | 3 | 3 | 3 | 3 | 3 |
| 40 | 325 | 175 | 100 | 25 | 15 | 7 | 5 | 3 | 3 |
| 60 | 375 | 200 | 120 | 40 | 30 | 12 | 10 | 7 | 7 |
| 98 | 475 | 250 | 160 | 60 | 50 | 25 | 20 | 17 | 17 |

## Initial Supporting table - leacCylInversionJerk

**Description:** Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

**Value Units:** Change in Delta time per cylinder from last cylinder (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 100 | 25 | 10 | 5 | 5 | 3 | 3 | 3 | 3 |
| 12 | 250 | 80 | 30 | 18 | 10 | 3 | 3 | 3 | 3 |
| 16 | 350 | 150 | 100 | 35 | 16 | 5 | 3 | 3 | 3 |
| 20 | 600 | 300 | 185 | 75 | 20 | 15 | 5 | 4 | 4 |
| 24 | 800 | 450 | 230 | 100 | 30 | 19 | 14 | 5 | 5 |
| 30 | 950 | 600 | 350 | 115 | 45 | 25 | 18 | 12 | 12 |
| 40 | 1,025 | 650 | 450 | 200 | 90 | 40 | 30 | 20 | 20 |
| 60 | 1,100 | 700 | 475 | 225 | 100 | 50 | 35 | 25 | 25 |
| 98 | 1,250 | 800 | 535 | 275 | 120 | 70 | 45 | 40 | 40 |

# Initial Supporting table - EngineOverSpeedLimit

**Description:** Engine OverSpeed Limit versus gear

**Value Units:** RPM
**X Unit:** Enumeration of transmission gear state (enumeration)

**EngineOverSpeedLimit - Part 1**

| y/x | CeTGRR_e_TransGr1 | CeTGRR_e_TransGr2 | CeTGRR_e_TransGr3 | CeTGRR_e_TransGr4 | CeTGRR_e_TransGr5 | CeTGRR_e_TransGr6 | CeTGRR_e_TransGr9 |
|---|---|---|---|---|---|---|---|
| 1 | 5,800 | 5,800 | 5,800 | 5,800 | 5,800 | 5,800 | 5,800 |

**EngineOverSpeedLimit - Part 2**

| y/x | CeTGRR_e_TransGr10 | CeTGRR_e_TransGrNeut | CeTGRR_e_TransGrRvrs | CeTGRR_e_TransGrPark | CeTGRR_e_TransGr7 | CeTGRR_e_TransGr8 | |
|---|---|---|---|---|---|---|---|
| 1 | 5,800 | 3,500 | 4,000 | 3,500 | 5,800 | 5,800 | |

# Initial Supporting table - InfrequentRegen

**Description:** Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

**Value Units:** Enumerated value of different combustion modes (enumeration)
**X Unit:** Current Combustion Mode (enumeration)

| **InfrequentRegen - Part 1** | | | | | | |
|---|---|---|---|---|---|---|
| y/x | 0 | 1 | 2 | 3 | 4 | 5 |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax |
| **InfrequentRegen - Part 2** | | | | | | |
| y/x | 6 | 7 | 8 | 9 | 10 | 11 |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax |
| **InfrequentRegen - Part 3** | | | | | | |
| y/x | 12 | 13 | 14 | 15 | 16 | |
| 1 | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | CeCMBR_i_CombModesMax | |

# Initial Supporting table - Number of Normals

**Description:** Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

**Value Units:** Number of Engine cycles after isolated misfire (Engine cycles)
**X Unit:** thousands of RPM (rpm/1000)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

# Initial Supporting table - P00C6 - High Pressure Pump Control Mode timeout

**Description:** High Pressure Pump Control Mode timeout

**Value Units:** Time (Seconds)
**X Unit:** Coolant Temperature (Deg C)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |

## - P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure St;

**Description:** The maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (HPS) is executed but before engine is in run mode.

**Value Units:** maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (Count)
**X Unit:** Coolant Temperature (Deg C)
**Y Units:** Ethanol Precent (%)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 13 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 25 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 38 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 50 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 63 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 75 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 88 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 100 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

## Initial Supporting table - P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start

**Description:** The minimum acceptable value of fuel rail pressure after High Pressure Start (HPS) is executed. This ensures the pressure does not fall off drastically after High Pressure Start (HPS) is executed, but before engine is in run mode.

**Value Units:** Minimum acceptable value of fuel rail pressure after High Pressure Start (Mpa)
**X Unit:** Coolant Temperature (Deg C)
**Y Units:** Ethanol Precent (%)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 13 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 25 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 38 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 50 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 63 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 75 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 88 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 100 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

## Initial Supporting table - P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

**Description:** This calibration is the minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

**Value Units:** Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery
**X Unit:** Coolant Temperature (Deg C)
**Y Units:** Ethanol Precent (%)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 11.0 | 12.0 | 10.0 | 10.0 | 8.0 | 5.0 | 4.0 | 2.0 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 13 | 11.0 | 12.0 | 10.0 | 10.0 | 8.0 | 5.0 | 4.0 | 2.0 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 25 | 12.0 | 12.0 | 12.0 | 12.0 | 8.0 | 5.0 | 5.0 | 3.0 | 2.5 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 38 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 6.0 | 5.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 50 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 6.0 | 5.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 63 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 7.0 | 6.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 75 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 7.5 | 7.0 | 5.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 88 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 7.5 | 7.0 | 6.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 100 | 13.0 | 13.0 | 13.0 | 13.0 | 10.0 | 8.6 | 7.5 | 7.0 | 6.0 | 5.0 | 4.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

# Initial Supporting table - P0420_BestFailingOSCTableB1

**Description:** This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow,the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio forthat specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

| y/x | 10.61 | 10.94 | 11.27 | 11.60 | 11.93 | 12.26 | 12.60 | 12.93 | 13.26 | 13.59 | 13.92 | 14.25 | 14.58 | 14.91 | 15.24 | 15.58 | 15.91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526.00 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 | 0.48 | 0.46 |
| 566.00 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 | 0.47 |
| 606.00 | 0.71 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 | 0.49 | 0.47 |
| 646.00 | 0.72 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 | 0.48 |
| 685.00 | 0.72 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 |
| 725.00 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 | 0.49 |
| 765.00 | 0.74 | 0.72 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 |
| 805.00 | 0.74 | 0.72 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 |
| 845.00 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 |

**Initial Supporting table - P0420_.WorstPassingOSCTableBI**

**Description:** This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test.The values ih this table are based on the measured OSC for the WPApart across the temp and airflow range.

| y/x | 10.61 | 10.94 | 11.27 | 11.60 | 11.93 | 12.26 | 12.60 | 12.93 | 13.26 | 13.59 | 13.92 | 14.25 | 14.58 | 14.91 | 15.24 | 15.58 | 15.91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526.00 | 0.91 | 0.89 | 0.88 | 0.87 | 0.85 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 |
| 566.00 | 0.92 | 0.90 | 0.88 | 0.87 | 0.86 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.71 | 0.69 | 0.67 |
| 606.00 | 0.92 | 0.91 | 0.89 | 0.88 | 0.86 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 | 0.70 | 0.68 |
| 646.00 | 0.92 | 0.91 | 0.89 | 0.88 | 0.87 | 0.85 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 |
| 685.00 | 0.93 | 0.92 | 0.90 | 0.88 | 0.87 | 0.86 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.71 | 0.69 |
| 725.00 | 0.93 | 0.92 | 0.91 | 0.89 | 0.88 | 0.86 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 | 0.70 |
| 765.00 | 0.94 | 0.92 | 0.91 | 0.89 | 0.88 | 0.87 | 0.85 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 |
| 805.00 | 0.95 | 0.93 | 0.92 | 0.90 | 0.88 | 0.87 | 0.86 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.71 |
| 845.00 | 0.95 | 0.93 | 0.92 | 0.91 | 0.89 | 0.88 | 0.86 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 |

# Initial Supporting table - P0430_BestFailingOSCTableB2

**Description:** This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow,the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio forthat specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

| y/x | 10.61 | 10.94 | 11.27 | 11.60 | 11.93 | 12.26 | 12.60 | 12.93 | 13.26 | 13.59 | 13.92 | 14.25 | 14.58 | 14.91 | 15.24 | 15.58 | 15.91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526.00 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 | 0.48 | 0.46 | 0.45 | 0.43 |
| 566.00 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 | 0.47 | 0.46 | 0.44 |
| 606.00 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 | 0.49 | 0.47 | 0.46 | 0.45 |
| 646.00 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 | 0.48 | 0.46 | 0.45 |
| 685.00 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 | 0.47 | 0.46 |
| 725.00 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 | 0.49 | 0.47 | 0.46 |
| 765.00 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 | 0.58 | 0.57 | 0.55 | 0.54 | 0.53 | 0.51 | 0.50 | 0.48 | 0.46 |
| 805.00 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 | 0.58 | 0.56 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 | 0.47 |
| 845.00 | 0.71 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 | 0.58 | 0.57 | 0.55 | 0.54 | 0.52 | 0.50 | 0.49 | 0.47 |

# Initial Supporting table - P0430_WorstPassingOSCTableB2

**Description:** This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test.The values in this table are based on the measured OSC for the WPApart across the temp and airflow range.

| y/x | 10.61 | 10.94 | 11.27 | 11.60 | 11.93 | 12.26 | 12.60 | 12.93 | 13.26 | 13.59 | 13.92 | 14.25 | 14.58 | 14.91 | 15.24 | 15.58 | 15.91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 526.00 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 | 0.59 |
| 566.00 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 | 0.59 |
| 606.00 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 | 0.70 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 | 0.60 |
| 646.00 | 0.85 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 | 0.61 |
| 685.00 | 0.86 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.71 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 | 0.61 |
| 725.00 | 0.86 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 | 0.62 |
| 765.00 | 0.87 | 0.85 | 0.83 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.75 | 0.73 | 0.71 | 0.70 | 0.68 | 0.67 | 0.65 | 0.63 | 0.62 |
| 805.00 | 0.87 | 0.86 | 0.84 | 0.83 | 0.81 | 0.79 | 0.78 | 0.76 | 0.75 | 0.74 | 0.72 | 0.70 | 0.68 | 0.67 | 0.66 | 0.64 | 0.63 |
| 845.00 | 0.88 | 0.86 | 0.84 | 0.83 | 0.82 | 0.80 | 0.79 | 0.77 | 0.75 | 0.74 | 0.72 | 0.71 | 0.69 | 0.67 | 0.66 | 0.64 | 0.63 |

# Initial Supporting table - Pair_SCD_Decel

**Description:** Used for P0300 - P0308, Mulitplier to SCDJDecel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 0.90 | 0.90 | 0.69 | 0.88 | 0.90 | 0.80 | 0.85 | 0.89 | 0.90 |
| 12 | 0.83 | 0.83 | 0.88 | 0.90 | 0.88 | 0.82 | 0.88 | 0.83 | 0.89 |
| 16 | 0.80 | 0.80 | 0.80 | 0.90 | 0.89 | 0.87 | 0.90 | 0.88 | 0.62 |
| 20 | 0.86 | 0.86 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 24 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 30 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 40 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 60 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 98 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |

## Initial Supporting table - Pair_SCD_Jerk

**Description:** Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different Patternof Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table ■PairCylModeDecel

**Description:** Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** mulitplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 0.88 | 0.88 | 0.89 | 0.86 | 0.84 | 0.87 | 0.90 | 0.90 | 0.89 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| 12 | 0.90 | 0.88 | 0.87 | 0.88 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.88 | 0.89 | 0.75 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| 16 | 0.77 | 0.83 | 0.90 | 0.89 | 0.89 | 0.88 | 0.88 | 0.86 | 0.84 | 0.89 | 0.90 | 0.79 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| 20 | 0.86 | 0.88 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.88 | 0.83 | 0.83 | 0.82 | 0.79 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 |
| 24 | 0.83 | 0.87 | 0.90 | 0.90 | 0.90 | 0.88 | 0.86 | 0.87 | 0.90 | 0.80 | 0.85 | 0.83 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| 30 | 0.73 | 0.79 | 0.86 | 0.88 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.89 | 0.80 | 0.81 | 0.76 | 0.76 | 0.76 | 0.76 | 0.76 |
| 40 | 0.59 | 0.64 | 0.70 | 0.74 | 0.78 | 0.84 | 0.90 | 0.90 | 0.90 | 0.85 | 0.90 | 0.85 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| 60 | 0.50 | 0.50 | 0.51 | 0.54 | 0.56 | 0.60 | 0.65 | 0.66 | 0.69 | 0.62 | 0.69 | 0.74 | 0.71 | 0.71 | 0.71 | 0.71 | 0.71 |
| 98 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.54 | 0.65 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |

# Initial Supporting table - PairCylModeJerk

**Description:** Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Initial Supporting table - 1Random_SCD_Decel

**Description:** Used for P0300 - P0308, Mulitplier to SCDJDecel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 12 | 1.15 | 1.15 | 1.15 | 1.10 | 1.10 | 1.10 | 1.10 | 1.15 | 1.15 |
| 16 | 1.15 | 1.15 | 1.15 | 1.10 | 1.10 | 1.10 | 1.10 | 1.15 | 1.15 |
| 20 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 24 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 30 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 40 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 60 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 98 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |

# Initial Supporting table - Random_SCD_Jerk

**Description:** Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - RandomAFM_Decl

**Description:** Used for P0300 - P0308, Mulitplierto CylinderJDecel while in Cylnder Deactivatibn mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table ■RandomAFM_Jerk

**Description:** Used for P0300 - P0308, Mulitplierto Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 800 | 1,000 | 1,200 | 1,600 | 2,000 | 2,400 | 2,600 | 3,000 | 3,500 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Initial Supporting table - RandomCylModDecel

**Description:** Used for P0300 - P0308. Multiplier to CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** Multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.10 | 1.10 | 1.10 | 1.10 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 12 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 16 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 20 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 24 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 30 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 40 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 60 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| 98 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |

## Initial Supporting table - RandomCylModJerk

**Description:** Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 3,001 | 5,000 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

## Initial Supporting table - F̄andomRevModDecl

**Description:** Used for P0300 - P0308, Mulitplier to RevMode_Decel to account for different p; ttern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 60 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - RepetSnapDecayAdjst

**Description:** Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

**Value Units:** multiplier
**X Unit:** RPM

| y/x | 900 | 1,100 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 4,000 | 5,000 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.00 | 1.31 | 1.17 | 1.08 | 1.17 | 1.00 | 1.00 | 1.00 | 1.00 |

# Initial Supporting table - RevMode_Decel

**Description:** Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function **o**f rpm and % engine Load.

**Value Units:** Delta time between revolutions (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 100 | 65 | 45 | 34 | 25 | 23 | 21 | 21 |
| 6 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 100 | 65 | 45 | 34 | 25 | 23 | 21 | 21 |
| 8 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 100 | 65 | 45 | 34 | 25 | 23 | 21 | 21 |
| 10 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 100 | 65 | 45 | 34 | 25 | 23 | 21 | 21 |
| 12 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 110 | 65 | 45 | 32 | 25 | 25 | 23 | 23 |
| 14 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 105 | 65 | 45 | 32 | 25 | 25 | 23 | 23 |
| 16 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 135 | 85 | 55 | 32 | 25 | 25 | 23 | 23 |
| 18 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 160 | 100 | 65 | 38 | 25 | 25 | 23 | 23 |
| 20 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 180 | 110 | 70 | 45 | 30 | 30 | 25 | 25 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 200 | 130 | 80 | 55 | 40 | 30 | 25 | 25 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 235 | 140 | 80 | 50 | 44 | 35 | 30 | 30 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 250 | 150 | 90 | 55 | 46 | 40 | 35 | 35 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 300 | 170 | 120 | 80 | 52 | 50 | 45 | 45 |
| 40 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 380 | 240 | 150 | 110 | 80 | 60 | 55 | 55 |
| 60 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 460 | 325 | 220 | 160 | 115 | 90 | 85 | 85 |
| 78 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 520 | 400 | 265 | 210 | 140 | 115 | 110 | 110 |
| 97 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 575 | 460 | 315 | 245 | 165 | 140 | 135 | 135 |

# Initial Supporting table - Ring Filter

**Description:** Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

**Value Units:** Number of Engine cycles after isolated misfire (Engine cycles)
**X Unit:** thousands of RPM (rpm/1000)

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

## Initial Supporting tatjle - SCD Decel

**Description:** Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller Windowsnear TDC. Thresholds are a function of rpm and % engine Load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 741 | 570 | 300 | 175 | 130 | 95 | 70 | 52 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 715 | 550 | 290 | 165 | 130 | 90 | 65 | 45 | 40 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 780 | 500 | 300 | 170 | 125 | 95 | 65 | 52 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 845 | 630 | 350 | 210 | 145 | 105 | 70 | 55 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 975 | 725 | 415 | 240 | 150 | 115 | 80 | 55 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 1,105 | 850 | 475 | 300 | 200 | 140 | 95 | 70 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 1,170 | 900 | 535 | 350 | 245 | 170 | 125 | 85 | 60 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 1,300 | 1,000 | 600 | 375 | 275 | 200 | 140 | 100 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 1,430 | 1,100 | 700 | 425 | 320 | 220 | 150 | 115 | 75 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 40 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 60 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 78 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 97 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - SCD_Jerk

**Description:** Used for P0300-P0308. Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

**Value Units:** Change in Delta time per cylinder from last cylinder (usee)
**X Unit:** RPM
**Y Units:** percent load of max indicated torque (%)

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 741 | 570 | 300 | 175 | 130 | 95 | 70 | 48 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 715 | 550 | 270 | 130 | 110 | 90 | 53 | 38 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 624 | 480 | 270 | 150 | 105 | 85 | 60 | 42 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 793 | 610 | 350 | 200 | 140 | 95 | 60 | 45 | 30 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 943 | 725 | 415 | 235 | 140 | 115 | 80 | 50 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 1,105 | 850 | 475 | 300 | 200 | 140 | 95 | 65 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 1,170 | 900 | 535 | 350 | 245 | 170 | 125 | 85 | 60 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 1,300 | 1,000 | 600 | 375 | 275 | 200 | 140 | 90 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 1,430 | 1,100 | 700 | 425 | 320 | 220 | 150 | 115 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 40 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 60 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 78 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 97 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - ShapDecayAfterMisfire

**Description:** Used for P0300 - P0308, multiplier times the ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

**Value Units:** multiplier
**X Unit:** RPM
**Y Units:** gear ratio

| y/x | 900 | 1,100 | 1,400 | 1,800 | 2,200 | 2,600 | 3,000 | 4,000 | 5,000 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.17 | 1.23 | 1.50 | 1.65 | 1.42 | 1.97 | 2.00 | 2.00 | 2.00 |
| 1 | 1.17 | 1.23 | 1.50 | 1.65 | 1.42 | 1.97 | 2.00 | 2.00 | 2.00 |
| 1 | 1.17 | 1.23 | 1.50 | 1.65 | 1.42 | 1.97 | 2.00 | 2.00 | 2.00 |
| 1 | 1.10 | 1.14 | 1.54 | 1.28 | 1.25 | 1.15 | 1.43 | 1.43 | 1.43 |
| 2 | 1.97 | 2.00 | 2.00 | 1.44 | 1.39 | 1.67 | 1.67 | 1.67 | 1.67 |
| 2 | 1.92 | 1.41 | 1.39 | 1.63 | 1.54 | 1.80 | 1.83 | 1.83 | 1.83 |
| 2 | 1.88 | 1.41 | 1.57 | 1.47 | 1.59 | 2.00 | 2.00 | 2.00 | 2.00 |
| 3 | 2.00 | 1.67 | 1.83 | 1.47 | 1.59 | 2.00 | 2.00 | 2.00 | 2.00 |
| 5 | 2.00 | 1.67 | 1.83 | 1.47 | 1.59 | 2.00 | 2.00 | 2.00 | 2.00 |

## Initial Supporting table - TOSSRoughRoadThres

**Description:** Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

**Value Units:** change in rpm per sec (rpm)
**X Unit:** Engine Speed (RPM)
**Y Units:** Transmission Speed (RPM)

| y/x | 600 | 800 | 1,000 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 200 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 300 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 400 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 500 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 600 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 700 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 800 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 900 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1,000 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1,100 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1,200 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1,300 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1,400 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

## Initial Supporting table - WaitToStart

**Description:** Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

**Value Units:** Number of Engine Cycles (integer)
**X Unit:** Engine Coolant (deg C)

| y/x | -20 | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - WSSRoughRoadThres

**Description:** Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

**Value Units:** acceleration
**X Unit:** Vehicle Speed (KPH)

| y/x | 0 | 12 | 24 | 36 | 48 | 60 | 72 | 85 | 97 | 109 | 121 | 133 | 145 | 157 | 169 | 181 | 193 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.40002 | 0.42004 | 0.43994 | 0.45996 | 0.47998 | 0.50000 | 0.52002 | 0.54004 | 0.56006 | 0.57996 | 0.59998 | 0.62000 | 0.64001 | 0.66003 | 0.68005 | 0.69995 | 0.71997 |

# Initial Supporting table - ZeroTorqueAFM

**Description:** Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

**Value Units:** Percent of Maximum Brake torque (%)
**X Unit:** RPM
**Y Units:** Barometric Pressure (kPa)

**ZeroTorqueAFM - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | 0.90 | 0.90 | 0.90 | 0.90 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 |
| 75 | 0.90 | 0.90 | 0.90 | 0.90 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 |
| 85 | 0.90 | 0.90 | 0.90 | 0.90 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 |
| 95 | 0.90 | 0.90 | 0.90 | 0.90 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 |
| 105 | 0.90 | 0.90 | 0.90 | 0.90 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 |

**ZeroTorqueAFM - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | 0.80 | 0.80 | 0.80 | 1.10 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 75 | 0.80 | 0.80 | 0.80 | 1.10 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 85 | 0.80 | 0.80 | 0.80 | 1.10 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 95 | 0.80 | 0.80 | 0.80 | 1.10 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 105 | 0.80 | 0.80 | 0.80 | 1.10 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |

# Initial Supporting table - ZeroTorqueEngLoad

**Description:** Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

**Value Units:** Percent of Maximum Brake torque (%)
**X Unit:** RPM
**Y Units:** Barometric Pressure (kPa)

**ZeroTorqueEngLoad - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | -3.00 | -3.00 | -3.00 | -2.75 | -2.50 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | 0.50 | 0.90 |
| 75 | -3.00 | -3.00 | -3.00 | -2.75 | -2.50 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | 0.50 | 0.90 |
| 85 | -3.00 | -3.00 | -3.00 | -2.75 | -2.50 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | 0.50 | 0.90 |
| 95 | -3.00 | -3.00 | -3.00 | -2.75 | -2.50 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | 0.50 | 0.90 |
| 105 | -3.00 | -3.00 | -3.00 | -2.75 | -2.50 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | -2.00 | 0.50 | 0.90 |

**ZeroTorqueEngLoad - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | 1.00 | 1.20 | 1.30 | 1.60 | 1.70 | 1.70 | 4.56 | 7.42 | 10.28 | 13.14 | 16.00 | 18.86 | 24.58 |
| 75 | 1.00 | 1.20 | 1.30 | 1.60 | 1.70 | 1.70 | 4.56 | 7.42 | 10.28 | 13.14 | 16.00 | 18.86 | 24.58 |
| 85 | 1.00 | 1.20 | 1.30 | 1.60 | 1.70 | 1.70 | 4.56 | 7.42 | 10.28 | 13.14 | 16.00 | 18.86 | 24.58 |
| 95 | 1.00 | 1.20 | 1.30 | 1.60 | 1.70 | 1.70 | 4.56 | 7.42 | 10.28 | 13.14 | 16.00 | 18.86 | 24.58 |
| 105 | 1.00 | 1.20 | 1.30 | 1.60 | 1.70 | 1.70 | 4.56 | 7.42 | 10.28 | 13.14 | 16.00 | 18.86 | 24.58 |

## Initial Supporting table - Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

**Description:** Integral Offset voltage thresholds (bank and cell specific cals) used with KeFCLP_Pct_CatAccuSlphrPostDsbl to check for sulphur poisoning.

**Value Units:** millivolts
**X Unit:** Post Catalyst Number

| y/x | CiOXYR_O2_PostCat1 | CiOXYR_O2_PostCat2 |
|---|---|---|
| CiFCLP_Decel | 1,000 | 1,000 |
| CiFCLPJdle | 1,000 | 1,000 |
| CiFCLP_Cruise | 1,000 | 1,000 |
| CiFCLP_LightAccel | 1,000 | 1,000 |
| CiFCLP_HeavyAccel | 1,000 | 1,000 |

## Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

**Description:** Number of times a post oxygen sensor value must be in range before declaring it ready

**Value Units:** Time (events * 12.5 milliseconds)

| y/x | 1 |
|---|---|
| 1 | 10 |

## Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

**Description:** Number of times a pre oxygen sensor value must be in range before declaring it ready

**Value Units:** Time (events * 12.5 milliseconds)

| y/x | 1 |
|---|---|
| 1 | 10 |

## Initial Supporting table - Closed Loop Enable Clarification - KeEOSDURichThrsh

**Description:** The oxygen sensor voltage above which a sensor will be considered failing during a Rich Test.

**Value Units:** Volts

| y/x | 1 |
|---|---|
| 1 | 1,050 |

## Initial Supporting table - Closed Loop Enable Clarification - KeFCLP dm IntegrationAirflowMax

**Description:** Maximum allowed estimated airflow for post 02 integral terms to be updated.

**Value Units:** Grams per Second

| y/x | 1 |
|---|---|
| 1 | 512 |

## Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

**Description:** Sulphur percent threshold above which post integral learning is disabled if the threshold criteria KaFCLP_U_SlphrIntglOfst_Thrsh is also met.

**Value Units:** Percent

| y/x | 1 |
|---|---|
| 1 | 75 |

## Initial Supporting table - Closed Loop Enable Clarification - KeFCLPTIntegrationCatalystMax

**Description:** Maximum allowed estimated catalytic converter temperature for post 02 integral terms to be updated.

**Value Units:** Celcius

| y/x | 1 |
|---|---|
| 1 | 950 |

## Initial Supporting table - Closed Loop Enable Clarification - KeFCLPTIntegrationCatalystMin

**Description:** Minimum allowed estimated catalytic converter temperature to begin using post 02 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post 02 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post 02 integration will not be allowed below this converter temperature

**Value Units:** Celcius

| y/x | 1 |
|---|---|
| 1 | 500 |

## Initial Supporting table - Closed Loop Enable Clarification - KeFULC_T_WRAF_SensorReadyThrsh

**Description:** Pumping cell temperature threshold above which the wideband oxygen sensor will be considered ready for use

**Value Units:** Degrees Celcius

| y/x | 1 |
|---|---|
| 1 | 700 |

## Initial Supporting table - Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL

**Description:** WRAF heater temperature enabling threshold fortransition from Open Loop to Closed Loop

**Value Units:** Degrees Celcius

| y/x | 1 |
|---|---|
| 1 | 628 |

## Initial Supporting table - Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable

**Description:** WRAF heater temperature threshold for enabling the sensor pump current

**Value Units:** Degrees Celcius

| y/x | 1 |
|---|---|
| 1 | 628 |

## Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant

**Description:** LTM learning is inhibited if the engine coolant temperature is below this calibration.

**Value Units:** Degrees Celcius

| y/x | 1 |
|---|---|
| 1 | 37 |

## Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

**Description:** Voltage limit checked against when determining if a post converter oxygen sensor is in range

**Value Units:** millivolts

| y/x | 1 |
|---|---|
| 1 | 1,100 |

## Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

**Description:** Voltage limit checked against when determining if a pre converter oxygen sensor is in range

**Value Units:** millivolts

| y/x | 1 |
|---|---|
| 1 | 1,795 |

## Initial Supporting table - Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit

**Description:** Long term fuel learning is disabled below this MAP limit as a function of barometric pressure.

**Value Units:** KPa
**X Unit:** KPa

| y/x | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |

# Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime

**Description:** Disable integral offset after engine start for this amount of time as a function of start up coolant temperature.

**Value Units:** Time in seconds
**X Unit:** Degrees Celcius

| y/x | -40 | -29 | -18 | -6 | 5 | 16 | 28 | 39 | 50 | 61 | 73 | 84 | 95 | 106 | 118 | 129 | 140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 220.0 | 220.0 | 220.0 | 196.0 | 120.0 | 72.0 | 60.0 | 60.0 | 52.0 | 41.0 | 35.0 | 32.0 | 36.0 | 40.0 | 44.0 | 60.0 | 60.0 |

# Initial Supporting table - Closed Loop Enable Clarification - KtFCLPtPostIntglRampInTime

**Description:** Time required to ramp integral offset to desired value as a function of start up coolant temperature.

**Value Units:** Time in seconds
**X Unit:** Degrees Celcius

| y/x | -40 | -29 | -18 | -6 | 5 | 16 | 28 | 39 | 50 | 61 | 73 | 84 | 95 | 106 | 118 | 129 | 140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60.0 | 60.0 | 60.0 | 60.0 | 60.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |

## Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

**Description:** Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

**Value Units:** Time in seconds
**X Unit:** Degrees Celcius

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 25 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 50 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 75 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 100 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

## Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

**Description:** Engine run time, as a function of startup coolant temperature, which must be exceeded to enable CLOSED LOOP.

**Value Units:** Time in seconds
**X Unit:** Degrees Celcius

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 27.0 | 20.0 | 10.0 | 5.0 | 3.0 | 3.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 25 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 27.0 | 20.0 | 10.0 | 5.0 | 3.0 | 3.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 50 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 27.0 | 20.0 | 10.0 | 5.0 | 3.0 | 3.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 75 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 27.0 | 20.0 | 10.0 | 5.0 | 3.0 | 3.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 100 | 360.0 | 300.0 | 240.0 | 180.0 | 130.0 | 42.0 | 32.0 | 27.0 | 20.0 | 10.0 | 5.0 | 3.0 | 3.0 | 8.0 | 8.0 | 8.0 | 8.0 |

# Initial Supporting table - P0442 Volatility Time as a Function of Estimate of Ambient Temperature

**Description:** EONV volatility time as a function of estimated ambient temperature

**Value Units:** Volatility time (seconds)
**X Unit:** Estimated Ambient Temperature (Deg C)

| y/x | -10 | -4 | 1 | 7 | 13 | 18 | 24 | 29 | 35 | 41 | 46 | 52 | 58 | 63 | 69 | 74 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 45 | 45 | 45 | 45 | 49 | 57 | 105 | 173 | 340 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |

## Initial Supporting table - P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

**Description:** Maximum engine off time before vehicle off time as a function of estimated ambient temperature (EAT)

**Value Units:** Maximum Engine Off Time Before Vehicle Off Time (seconds)
**X Unit:** Estimated Ambient Temperature (Deg C)

| y/x | -10 | -4 | 1 | 7 | 13 | 18 | 24 | 29 | 35 | 41 | 46 | 52 | 58 | 63 | 69 | 74 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

## Initial Supporting table - P0442 EON) V Pressure Threshold (Pascals)

**Description:** EONV pressure threshold as a function of fuel level and estimated ambient temperature (EAT)

**Value Units:** EONV Pressure Threshold (Pascals)
**X Unit:** Fuel Level (percent) from 0 to 100 with step size 6.25
**Y Units:** Estimated Ambient Temperature (deg C) from -10 to 80 with step size 5.625

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 2 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 3 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 4 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 5 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 6 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 7 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 8 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 9 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 10 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 11 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 12 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 13 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 14 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 15 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 16 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |
| 17 | -311.4 | -299.7 | -288.0 | -276.3 | -264.7 | -253.0 | -241.3 | -229.6 | -218.0 | -206.3 | -194.6 | -182.9 | -171.2 | -159.6 | -147.9 | -136.2 | -124.5 |

# Initial Supporting table - P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level

**Description:** Purge valve leak test engine vacuum test time as a function of fuel level

**Value Units:** Purge Valve Leak Test Engine Vacuum Test Time (seconds)
**X Unit:** Fuel Level (percent)

| y/x | 0 | 6 | 12 | 19 | 25 | 31 | 37 | 44 | 50 | 56 | 62 | 69 | 75 | 81 | 87 | 94 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 48 | 47 | 46 | 44 | 43 | 42 | 40 | 39 | 37 | 36 | 35 | 33 | 32 | 31 | 29 | 28 | 26 |

## Initial Supporting table - P057B KtBRKI K CmpltTestPointWeight

**Description:**

| y/x | 0.000 | 0.010 | 0.025 | 0.033 | 0.050 | 0.250 | 0.500 | 0.750 | 1.000 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

## Initial Supporting table - P057B KtBRKI K FastTestPointWeight

**Description:**

| y/x | 0.000 | 0.010 | 0.025 | 0.033 | 0.050 | 0.250 | 0.500 | 0.750 | 1.000 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

## Initial Supporting table - DFCO CoolEnblHi Temp

**Description:**

| y/x | -40 | 0 | 25 |
|---|---|---|---|
| 1 | 30.0 | 30.0 | 45.0 |

# Initial Supporting table - DFCODelayAfterStartTime

**Description:**

| y/x | -30 | -10 | 20 | 60 | 90 |
|---|---|---|---|---|---|
| 1 | 20.0 | 15.0 | 10.0 | 8.0 | 5.0 |

# Initial Supporting table - DFCO DrvrReqZPTEnblOf

**Description:**

**DFCO_DrvrReqZPTEnblOf - Part 1**

| y/x | CeDTRR_e_TrqShapingRateA | CeDTRR_e_TrqShapingRateB | CeDTRR_e_TrqShapingRateC | CeDTRR_e_TrqShapingRateD | CeDTRR_e_TrqShapingRateE |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 300 | 300 | 100 | 50 | 12 |
| CeTCOR_e_Exh_Sport | 300 | 300 | 100 | 50 | 12 |
| CeTCOR_e_Exh_Track | 300 | 300 | 100 | 50 | 12 |

**DFCO_DrvrReqZPTEnblOf - Part 2**

| y/x | CeDTRR_e_TrqShapingRateF | CeDTRR_e_TrqShapingRateG | CeDTRR_e_TrqShapingRateH | CeDTRR_e_TrqShapingRateI | CeDTRR_e_TrqShapingRateJ |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 12 | 12 | 12 | 12 | 12 |
| CeTCOR_e_Exh_Sport | 12 | 12 | 12 | 12 | 12 |
| CeTCOR_e_Exh_Track | 12 | 12 | 12 | 12 | 12 |

# Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

**Description:**

| y/x | CeTCOR_e_NonEcoMode | CeTCOR_e_EcoMode |
|---|---|---|
| CeTGRR_e_TransGr1 | 0 | 0 |
| CeTGRR_e_TransGr2 | 16 | 16 |
| CeTGRR_e_TransGr3 | 0 | 0 |
| CeTGRR_e_TransGr4 | 0 | 0 |
| CeTGRR_e_TransGr5 | 0 | 0 |
| CeTGRR_e_TransGr6 | 0 | 0 |
| CeTGRR_e_TransGr9 | 0 | 0 |
| CeTGRR_e_TransGrI0 | 0 | 0 |
| CeTGRR_e_TransGrNeut | 0 | 0 |
| CeTGRR_e_TransGrRvrs | 0 | 0 |
| CeTGRR_e_TransGrPark | 0 | 0 |
| CeTGRR_e_TransGr7 | 0 | 0 |
| CeTGRR_e_TransGr8 | 0 | 0 |

# Initial Supporting table - DFCO EnblHi Vehicle Speed

**Description:**

| y/x | CeTCOR_e_NonEcoMode | CeTCOR_e_EcoMode |
|---|---|---|
| CeTGRR_e_TransGr1 | 20.0 | 20.0 |
| CeTGRR_e_TransGr2 | 30.0 | 30.0 |
| CeTGRR_e_TransGr3 | 30.0 | 30.0 |
| CeTGRR_e_TransGr4 | 0.0 | 0.0 |
| CeTGRR_e_TransGr5 | 0.0 | 0.0 |
| CeTGRR_e_TransGr6 | 0.0 | 0.0 |
| CeTGRR_e_TransGr9 | 0.0 | 0.0 |
| CeTGRR_e_TransGrI0 | 0.0 | 0.0 |
| CeTGRR_e_TransGrNeut | 0.0 | 0.0 |
| CeTGRR_e_TransGrRvrs | 510.0 | 510.0 |
| CeTGRR_e_TransGrPark | 0.0 | 0.0 |
| CeTGRR_e_TransGr7 | 0.0 | 0.0 |
| CeTGRR_e_TransGr8 | 0.0 | 0.0 |

## Initial Supporting table - DFCO EngSpdEnblOfst

**Description:**

| y/x | -1,750 | -1,500 | -1,250 | -800 | -500 | -450 | -300 | -100 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | 100 | 100 | 100 | 100 | 75 | 25 | 0 | 0 |

# Initial Supporting table - DFCO MinRunImmDsblOf

**Description:**

**DFCO_MinRunImmDsblOf - Part 1**

| y/x | CeDTRR_e_TrqShapingRateA | CeDTRR_e_TrqShapingRateB | CeDTRR_e_TrqShapingRateC | CeDTRR_e_TrqShapingRateD | CeDTRR_e_TrqShapingRateE |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |
| CeTCOR_e_Exh_Sport | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |
| CeTCOR_e_Exh_Track | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |

**DFCO_MinRunImmDsblOf - Part 2**

| y/x | CeDTRR_e_TrqShapingRateF | CeDTRR_e_TrqShapingRateG | CeDTRR_e_TrqShapingRateH | CeDTRR_e_TrqShapingRateI | CeDTRR_e_TrqShapingRateJ |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |
| CeTCOR_e_Exh_Sport | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |
| CeTCOR_e_Exh_Track | 65,535 | 65,535 | 65,535 | 65,535 | 65,535 |

# Initial Supporting table - DFCO ZeroPedAxlTrqDisblOfst

**Description:**

**DFCO_ZeroPedAxlTrqDisblOfst - Part 1**

| y/x | CeDTRR_e_TrqShapingRateA | CeDTRR_e_TrqShapingRateB | CeDTRR_e_TrqShapingRateC | CeDTRR_e_TrqShapingRateD | CeDTRR_e_TrqShapingRateE |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 25 | 25 | 25 | 25 | 25 |
| CeTCOR_e_Exh_Sport | 25 | 25 | 25 | 25 | 25 |
| CeTCOR_e_Exh_Track | 25 | 25 | 25 | 25 | 25 |

**DFCO_ZeroPedAxlTrqDisblOfst - Part 2**

| y/x | CeDTRR_e_TrqShapingRateF | CeDTRR_e_TrqShapingRateG | CeDTRR_e_TrqShapingRateH | CeDTRR_e_TrqShapingRateI | CeDTRR_e_TrqShapingRateJ |
|---|---|---|---|---|---|
| CeTCOR_e_Exh_Normal | 25 | 25 | 25 | 25 | 25 |
| CeTCOR_e_Exh_Sport | 25 | 25 | 25 | 25 | 25 |
| CeTCOR_e_Exh_Track | 25 | 25 | 25 | 25 | 25 |

# Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

**Description:** Table of delta MAF values as a function of desired throttle position. The output of this table provides a delta MAF that if the measured minus the estimated MAF exceeds, is considered a fail.

**Value Units:** Delta MAF Values (dm)
**X Unit:** Desired Throttle Position (Pct)

| y/x | 5.00 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 100.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 19.49 | 26.27 | 31.22 | 37.95 | 40.99 | 48.13 | 255.00 | 255.00 | 255.00 |

# Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

**Description:** Table of delta MAP values as a function of desired throttle position. The output of this table provides a delta MAP that if the measured minus the estimated MAP exceeds, is considered a fail.

**Value Units:** Delta MAP Values (kPa)
**X Unit:** Desired Throttle Position (Pct)

| y/x | 5.00 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 100.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 24.95 | 28.45 | 26.12 | 25.02 | 19.11 | 17.30 | 255.00 | 255.00 | 255.00 |

# Initial Supporting table - P0068_Maximum MAF f(RPM)

**Description:** Table of maximum MAF values vs. engine speed. This is the maximum MAF the engine can see under all ambient conditions.

**Value Units:** Delta MAF Values (dm)
**X Unit:** Engine Speed (RPM)

| y/x | 600.00 | 1,400.00 | 2,200.00 | 3,000.00 | 3,800.00 | 4,600.00 | 5,400.00 | 6,200.00 | 7,000.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 25.00 | 57.00 | 93.00 | 135.00 | 188.00 | 236.00 | 265.00 | 275.00 | 275.00 |

# Initial Supporting table - P0068_Maximum MAF f(Volts)

**Description:** Table of maximum MAF values vs. system voltage. The output of the air meter is clamped to lower values as system voltage drops off.

**Value Units:** Delta MAF Values (dm)
**X Unit:** System Voltage (V)

| y/x | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 13.00 | 14.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 69.70 | 180.36 | 376.20 | 511.99 | 511.99 | 511.99 | 511.99 | 511.99 | 511.99 |

# Initial Supporting table - P0326_P0331_AbnormalNoise_Thresh_AFM

**Description:** Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine IS in AFM mode

**Value Units:** Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.412 | 0.417 | 0.409 | 0.431 | 0.484 | 0.475 | 0.525 | 0.527 | 0.561 | 0.676 | 0.730 | 0.730 | 0.730 | 0.730 | 0.730 | 0.730 | 0.730 |

# Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

**Value Units:** Max Time for Last Seed Timeout (ms)
**X Unit:** Operating Loop Sequence (enum)

**P0606_Last Seed Timeout f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 |

**P0606_Last Seed Timeout f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 500.000 | 500.000 | 1,000.000 | 2,500.000 | 8,191.875 | 8,191.875 | 8,191.875 |

# Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

**Value Units:** Fail threshold for PSW (count)
**X Unit:** Operating Loop (enum)

**P0606_PSW Sequence Fail f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 3 | 5 | 3 | 5 | 3 |

**P0606_PSW Sequence Fail f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 5 |

# Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

**Value Units:** Sample threshold for PSW (count)
**X Unit:** Operating Loop (enum)

**P0606_PSW Sequence Sample f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**P0606_PSW Sequence Sample f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

# Initial Supporting table - P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)

**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

**Value Units:** Run/Crank Voltages required to pull in PT Relay (V)
**X Unit:** Induction Air Temperature (deg C)

| y/x | 23.0 | 85.0 | 95.0 | 105.0 | 125.0 |
|---|---|---|---|---|---|
| 1 | 7.000 | 8.699 | 9.000 | 9.199 | 10.000 |

# Initial Supporting table - P16A7 PT Relay Pull-in Run/Crank Voltage f(IAT)

**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

**Value Units:** Run/Crank Voltages required to pull in PT Relay (V)
**X Unit:** Induction Air Temperature (deg C)

| y/x | 23.0 | 85.0 | 95.0 | 105.0 | 125.0 |
|---|---|---|---|---|---|
| 1 | 7.000 | 8.699 | 9.000 | 9.199 | 10.000 |

# Initial Supporting table - P16BC PT Relay Pull-In Run/Crank Voltage f(IAT)

**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

**Value Units:** Run/Crank Voltages required to pull in PT Relay (V)
**X Unit:** Induction Air Temperature (deg C)

| y/x | 23.0 | 85.0 | 95.0 | 105.0 | 125.0 |
|---|---|---|---|---|---|
| 1 | 7.000 | 8.699 | 9.000 | 9.199 | 10.000 |

# Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

**Value Units:** Max Time for Last Seed Timeout (ms)
**X Unit:** Operating Loop Sequence (enum)

**P0606_Last Seed Timeout f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 | 200.000 |

**P0606_Last Seed Timeout f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 200.000 | 500.000 | 500.000 | 1,000.000 | 2,500.000 | 8,191.875 | 8,191.875 | 8,191.875 |

# Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

**Value Units:** Fail threshold for PSW (count)
**X Unit:** Operating Loop (enum)

**P0606_PSW Sequence Fail f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 3 | 5 | 3 | 5 | 3 |

**P0606_PSW Sequence Fail f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 5 |

# Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

**Value Units:** Sample threshold for PSW (count)
**X Unit:** Operating Loop (enum)

**P0606_PSW Sequence Sample f(Loop Time) - Part 1**

| y/x | CePISR_e_2p5msSeq | CePISR_e_3p125msSeq | CePISR_e_5msSeq | CePISR_e_6p25msSeq | CePISR_e_10msSeq | CePISR_e_12p5msSeq | CePISR_e_20msSeq | CePISR_e_25msSeq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**P0606_PSW Sequence Sample f(Loop Time) - Part 2**

| y/x | CePISR_e_40msSeq | CePISR_e_50msSeq | CePISR_e_80msSeq | CePISR_e_100msSeq | CePISR_e_250msSeq | CePISR_e_EventA_Seq | CePISR_e_EventB_Seq | CePISR_e_EventC_Seq |
|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

# Initial Supporting table - P060C_Delta MAP Threshold f(Desired Engine Torque)

**Description:** Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

**Value Units:** Torque Security Threshold for Engine Sync and Time Based Delta Pressure (kPa)
**X Unit:** Desired Engine Torque (Nm)

| y/x | 0.00 | 50.00 | 100.00 | 150.00 | 200.00 | 300.00 |
|---|---|---|---|---|---|---|
| 1.00 | 17.30 | 17.30 | 17.30 | 17.30 | 17.30 | 17.30 |

# Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

**Description:** Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

**Value Units:** External Load Tablefor SPDR (Nm)
**X Unit:** Engine Oil Temperature (deg C)
**Y Units:** Engine Speed (RPM)

| y/x | -40.00 | -20.00 | -10.00 | 0.00 | 50.00 | 90.00 |
|---|---|---|---|---|---|---|
| 300.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 |
| 370.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 |
| 435.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 | 500.00 |
| 550.00 | 500.00 | 500.00 | 500.00 | 350.00 | 320.00 | 150.00 |
| 600.00 | 500.00 | 500.00 | 350.00 | 335.00 | 301.83 | 60.94 |
| 660.00 | 500.00 | 500.00 | 320.00 | 309.34 | 269.97 | 58.01 |
| 800.00 | 350.00 | 350.00 | 291.23 | 263.49 | 233.57 | 53.00 |
| 1,000.00 | 305.66 | 291.73 | 270.24 | 247.42 | 217.69 | 70.25 |
| 1,300.00 | 287.35 | 255.64 | 236.53 | 233.52 | 191.48 | 33.72 |
| 1,600.00 | 275.96 | 252.26 | 229.60 | 222.72 | 185.02 | -3.96 |
| 2,000.00 | 64.44 | 24.98 | 10.65 | 2.19 | -31.02 | -34.66 |
| 2,500.00 | 61.31 | 22.67 | -0.80 | -0.68 | -34.98 | -36.01 |
| 3,200.00 | 55.77 | 16.62 | -7.31 | -6.38 | -40.01 | -43.35 |
| 4,000.00 | 44.94 | 5.66 | -18.44 | -17.25 | -50.70 | -55.10 |
| 5,000.00 | 28.88 | -10.39 | -34.48 | -33.30 | -66.77 | -71.09 |
| 6,100.00 | 9.48 | -29.90 | -54.12 | -52.74 | -86.07 | -91.22 |
| 6,600.00 | -0.11 | -39.40 | -62.94 | -62.33 | -95.67 | -97.48 |

# Initial Supporting table - P0494_LIN_Threshold

**Description:** Tabulated LIN Fan1 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan1 Speed rpm
**Y Units:** Sensed LIN Fan1 Speed Lower Limit rpm

| y/x | 0 | 450 | 2,330 | 2,331 | 2,332 | 2,333 | 2,334 | 2,335 | 2,336 | 2,337 | 2,338 | 2,340 | 2,341 | 2,342 | 2,343 | 2,344 | 2,345 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 240 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 |

# Initial Supporting table - P2CB9_LIN_Threshold

**Description:** Tabulated LIN Fan2 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan2 Speed rpm
**Y Units:** Sensed LIN Fan2 Speed Lower Limit rpm

| y/x | 0 | 650 | 2,660 | 2,661 | 2,663 | 2,664 | 2,665 | 2,666 | 2,667 | 2,668 | 2,669 | 2,670 | 2,671 | 2,672 | 2,673 | 2,674 | 2,675 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 440 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 |

# Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - P0494_LIN_Threshold

**Description:** Tabulated LIN Fan1 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan1 Speed rpm
**Y Units:** Sensed LIN Fan1 Speed Lower Limit rpm

| y/x | 0 | 450 | 2,330 | 2,331 | 2,332 | 2,333 | 2,334 | 2,335 | 2,336 | 2,337 | 2,338 | 2,340 | 2,341 | 2,342 | 2,343 | 2,344 | 2,345 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 240 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 |

# Initial Supporting table - P2CB9_LIN_Threshold

**Description:** Tabulated LIN Fan2 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan2 Speed rpm
**Y Units:** Sensed LIN Fan2 Speed Lower Limit rpm

| y/x | 0 | 650 | 2,660 | 2,661 | 2,663 | 2,664 | 2,665 | 2,666 | 2,667 | 2,668 | 2,669 | 2,670 | 2,671 | 2,672 | 2,673 | 2,674 | 2,675 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 440 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 |

# Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 1 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 4 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 1 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 1 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48 | 70 | 130 | 200 | 201 | 202 | 203 | 204 | 205 |

# Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC OFF

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC OFF Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC OFF Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

**Description:** Open / Close Commands for Shutter 2 - AC ON

**Value Units:** Percent
**X Unit:** KPH
**Y Units:** Fan Command Percent

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

**Description:** Percent Fan Command Axis for Shutter 2 - AC ON Table

**Value Units:** Percent

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 13 | 17 | 18 | 28 | 29 | 80 | 100 |

# Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

**Description:** Vehicle Speed Axis for Shutter 2 - AC ON Table

**Value Units:** KPH

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 55 | 70 | 95 | 110 | 120 | 140 | 150 | 180 | 200 |

# Initial Supporting table - P0494_LIN_Threshold

**Description:** Tabulated LIN Fan1 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan1 Speed rpm
**Y Units:** Sensed LIN Fan1 Speed Lower Limit rpm

| y/x | 0 | 450 | 2,330 | 2,331 | 2,332 | 2,333 | 2,334 | 2,335 | 2,336 | 2,337 | 2,338 | 2,340 | 2,341 | 2,342 | 2,343 | 2,344 | 2,345 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 240 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 | 2,080 |

# Initial Supporting table - P2CB9_LIN_Threshold

**Description:** Tabulated LIN Fan2 Speed Low Limits

**Value Units:** rpm
**X Unit:** Commanded LIN Fan2 Speed rpm
**Y Units:** Sensed LIN Fan2 Speed Lower Limit rpm

| y/x | 0 | 650 | 2,660 | 2,661 | 2,663 | 2,664 | 2,665 | 2,666 | 2,667 | 2,668 | 2,669 | 2,670 | 2,671 | 2,672 | 2,673 | 2,674 | 2,675 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 440 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 | 2,390 |

# Initial Supporting table - Minimum Non-Purge Samples for Purge Vapor Fuel

**Description:** Number of Fuel Trim Monitor sample counts required to allow the Purge Vapor Fuel value to inhibit the Intrusive Rich test

**Value Units:** Sample Counts per loop rate of 100ms (divide by 10 to get seconds)
**X Unit:** Long Term Fuel Trim Cell LD. (no units) (Only PurgeOff cells are used)

| **Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1** | | | | |
|---|---|---|---|---|
| y/x | CeFADR_e_CellOO_PurgOnAirMode 5 | CeFADR_e_Cell01_PurgOnAirMode 4 | CeFADR_e_Cell02_PurgOnAirMode 3 | CeFADR_e_Cell03_PurgOnAirMode 2 |
| 1 | 65,535 | 65,535 | 65,535 | 65,535 |
| **Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2** | | | | |
| y/x | CeFADR_e_Cell04_PurgOnAirMode 1 | CeFADR_e_Cell05_PurgOnAirMode 0 | CeFADR_e_Cell06_PurgOnIdle | CeFADR_e_Cell07_PurgOnDecel |
| 1 | 65,535 | 65,535 | 65,535 | 65,535 |
| **Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3** | | | | |
| y/x | CeFADR_e_Cell08_PurgOffAirMode 5 | CeFADR_e_Cell09_PurgOffAirMode 4 | CeFADR_e_Cell 10_PurgOffAirMode 3 | CeFADR_e_Cell11_PurgOffAirMode 2 |
| 1 | 65,535 | 65,535 | 65,535 | 65,535 |
| **Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4** | | | | |
| y/x | CeFADR_e_Cell 12_PurgOffAirMode 1 | CeFADR_e_Cell13_PurgOffAirMode 0 | CeFADR_e_Cell14_PurgOffIdle | CeFADR_e_Cell1 5_PurgOffDecel |
| 1 | 65,535 | 65,535 | 65,535 | 65,535 |

# Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

**Description:** Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCeH"are not used for diagnosis.

| **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1** | | | | |
|---|---|---|---|---|
| y/x | CeFADR_e_CellOO_PurgOnAirMode 5 | CeFADR_e_Cell01_PurgOnAirMode 4 | CeFADR e Cell02 PurgOnAirMode 3 | CeFADR_e_Cell03_PurgOnAirMode 2 |
| 1 | CeFADD_e_SelectedPurgeCell | CeFADD_e_SelectedPurgeCell | CeFADD_e_8electedPurgeCell | CeFADD_e_SelectedPurgeCell |
| **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2** | | | | |
| y/x | CeFADR_e_Cell04_PurgOnAirMode 1 | CeFADR e Cell05 PurgOnAirMode 0 | CeFADR_e_Cell06_PurgOnldle | CeFADR_e_Cell07_PurgOnDecel |
| 1 | CeFADD_e_SelectedPurgeCell | CeFADD_e_SelectedPurgeCell | CeFADD_e_SelectedPurgeCell | CeFADD_e_SelectedPurgeCell |
| **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3** | | | | |
| y/x | CeFADR_e_Cell08_PurgOffAirMode 5 | CeFADR_e_Cell09_PurgOffAirMode 4 | CeFADR e Cell10 PurgOffAirMode 3 | CeFADR_e_Cell11_PurgOffAirMode 2 |
| 1 | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell |
| **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4** | | | | |
| y/x | CeFADR_e_Cell12_PurgOffAirMode 1 | CeFADR e Cell13 PurgOffAirMode 0 | CeFADR_e_Cell14_PurgOffldle | CeFADR_e_Cell15_PurgOffDecel |
| 1 | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell | CeFADD_e_SelectedNonPurgeCell |

# Initial Supporting table - Startup Engine Coolant adjusment to Minimum accumulation time

**Description:** Time offset added to the minimum accumulation time based on Startup Coolant.

**Value Units:** Counts (10 counts equals 1 second)
**X Unit:** Degree C

| y/x | -40 | -28 | -16 | -4 | 8 | 20 | 32 | 44 | 56 | 68 | 80 | 92 | 104 | 116 | 128 | 140 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 500 | 500 | 500 | 500 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - RufCyl Decel

**Description:** Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** rpm
**Y Units:** percent load of max indicated torque (%)

**RufCyl_Decel - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 1,430 | 1,100 | 675 | 400 | 275 | 200 | 140 | 105 | 70 | 49 | 31 | 18 | 15 |
| 6 | 1,430 | 1,100 | 675 | 400 | 275 | 200 | 140 | 100 | 70 | 47 | 30 | 18 | 14 |
| 8 | 1,625 | 1,250 | 750 | 480 | 325 | 225 | 145 | 100 | 70 | 47 | 31 | 22 | 15 |
| 10 | 1,820 | 1,400 | 825 | 525 | 335 | 225 | 175 | 100 | 65 | 42 | 29 | 26 | 22 |
| 12 | 1,950 | 1,500 | 875 | 575 | 360 | 235 | 180 | 105 | 50 | 31 | 20 | 34 | 24 |
| 14 | 2,145 | 1,650 | 1,039 | 650 | 385 | 315 | 185 | 110 | 53 | 27 | 25 | 40 | 26 |
| 16 | 2,795 | 2,150 | 1,111 | 730 | 420 | 325 | 212 | 115 | 58 | 39 | 40 | 45 | 32 |
| 18 | 3,094 | 2,380 | 1,183 | 775 | 425 | 336 | 255 | 130 | 75 | 38 | 40 | 50 | 38 |
| 20 | 3,336 | 2,566 | 1,255 | 869 | 493 | 362 | 350 | 150 | 90 | 77 | 66 | 58 | 45 |
| 22 | 3,579 | 2,753 | 1,325 | 929 | 527 | 387 | 400 | 175 | 125 | 105 | 86 | 66 | 50 |
| 24 | 3,770 | 2,900 | 1,900 | 1,100 | 659 | 561 | 525 | 385 | 280 | 194 | 129 | 86 | 65 |
| 26 | 4,030 | 3,100 | 2,000 | 1,175 | 800 | 700 | 575 | 400 | 300 | 210 | 144 | 102 | 70 |
| 28 | 4,586 | 3,528 | 2,211 | 1,335 | 929 | 795 | 712 | 457 | 375 | 266 | 187 | 136 | 86 |
| 30 | 4,902 | 3,771 | 2,327 | 1,426 | 959 | 844 | 780 | 475 | 402 | 289 | 209 | 162 | 93 |
| 32 | 5,240 | 4,031 | 2,449 | 1,524 | 990 | 895 | 854 | 493 | 430 | 315 | 236 | 192 | 100 |
| 34 | 5,602 | 4,309 | 2,578 | 1,627 | 1,022 | 949 | 935 | 513 | 461 | 343 | 266 | 228 | 108 |
| 36 | 5,988 | 4,606 | 2,714 | 1,738 | 1,055 | 1,007 | 1,024 | 533 | 494 | 375 | 300 | 270 | 116 |

**RufCyl_Decel - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - RufCyl Decel

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

# Initial Supporting table - RufCyl Jerk

**Description:** Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** rpm
**Y Units:** percent load of max indicated torque (%)

**RufCyl_Jerk - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 1,430 | 1,100 | 625 | 350 | 250 | 180 | 130 | 105 | 70 | 49 | 31 | 18 | 15 |
| 6 | 1,430 | 1,100 | 625 | 350 | 250 | 180 | 130 | 95 | 70 | 46 | 29 | 18 | 14 |
| 8 | 1,625 | 1,250 | 725 | 460 | 300 | 200 | 130 | 95 | 70 | 47 | 29 | 18 | 15 |
| 10 | 1,820 | 1,400 | 825 | 500 | 330 | 210 | 175 | 100 | 65 | 41 | 28 | 24 | 20 |
| 12 | 1,950 | 1,500 | 825 | 550 | 350 | 230 | 180 | 105 | 50 | 30 | 23 | 28 | 20 |
| 14 | 2,145 | 1,650 | 1,039 | 640 | 380 | 310 | 185 | 110 | 53 | 28 | 21 | 34 | 22 |
| 16 | 2,795 | 2,150 | 1,111 | 720 | 420 | 320 | 210 | 115 | 58 | 26 | 27 | 40 | 30 |
| 18 | 3,094 | 2,380 | 1,183 | 765 | 425 | 330 | 250 | 130 | 75 | 40 | 42 | 44 | 35 |
| 20 | 3,336 | 2,566 | 1,255 | 860 | 493 | 357 | 330 | 150 | 90 | 70 | 57 | 52 | 41 |
| 22 | 3,579 | 2,753 | 1,325 | 920 | 527 | 380 | 380 | 175 | 125 | 102 | 81 | 62 | 50 |
| 24 | 3,770 | 2,900 | 1,900 | 1,090 | 659 | 555 | 525 | 385 | 280 | 192 | 127 | 84 | 63 |
| 26 | 4,030 | 3,100 | 2,000 | 1,175 | 800 | 700 | 575 | 400 | 300 | 210 | 144 | 100 | 70 |
| 28 | 4,586 | 3,528 | 2,211 | 1,335 | 929 | 795 | 712 | 457 | 375 | 268 | 189 | 137 | 89 |
| 30 | 4,902 | 3,771 | 2,327 | 1,426 | 959 | 844 | 780 | 475 | 402 | 294 | 214 | 163 | 99 |
| 32 | 5,240 | 4,031 | 2,449 | 1,524 | 990 | 895 | 854 | 493 | 430 | 322 | 243 | 194 | 110 |
| 34 | 5,602 | 4,309 | 2,578 | 1,627 | 1,022 | 949 | 935 | 513 | 461 | 354 | 277 | 231 | 122 |
| 36 | 5,988 | 4,606 | 2,714 | 1,738 | 1,055 | 1,007 | 1,024 | 533 | 494 | 389 | 316 | 275 | 135 |

**RufCyl_Jerk - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - RufCyl Jerk

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

# Initial Supporting table - RufSCD Decel

**Description:** Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

**Value Units:** Delta time per cylinder (usee)
**X Unit:** rpm
**Y Units:** percent load of max indicated torque (%)

**RufSCD_Decel - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 741 | 570 | 300 | 175 | 130 | 95 | 70 | 52 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 715 | 550 | 290 | 165 | 130 | 90 | 65 | 45 | 40 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 780 | 500 | 300 | 170 | 125 | 95 | 65 | 52 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 845 | 630 | 350 | 210 | 145 | 105 | 70 | 55 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 975 | 725 | 415 | 240 | 150 | 115 | 80 | 55 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 1,105 | 850 | 475 | 300 | 200 | 140 | 95 | 70 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 1,170 | 900 | 535 | 350 | 245 | 170 | 125 | 85 | 60 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 1,300 | 1,000 | 600 | 375 | 275 | 200 | 140 | 100 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 1,430 | 1,100 | 700 | 425 | 320 | 220 | 150 | 115 | 75 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

**RufSCD_Decel - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - RufSCD Decel

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

# Initial Supporting table - RufSCD Jerk

**Description:** Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows nearTDC. Thresholds are a function of rpm and % engine Load.

**Value Units:** Delta time per cylinder (usee)
**X Unit:** rpm
**Y Units:** percent load of max indicated torque (%)

**RufSCD_Jerk - Part 1**

| y/x | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 741 | 570 | 300 | 175 | 130 | 95 | 70 | 48 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 715 | 550 | 270 | 130 | 110 | 90 | 53 | 38 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 624 | 480 | 270 | 150 | 105 | 85 | 60 | 42 | 42 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 793 | 610 | 350 | 200 | 140 | 95 | 60 | 45 | 30 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 943 | 725 | 415 | 235 | 140 | 115 | 80 | 50 | 35 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 1,105 | 850 | 475 | 300 | 200 | 140 | 95 | 65 | 50 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 1,170 | 900 | 535 | 350 | 245 | 170 | 125 | 85 | 60 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 1,300 | 1,000 | 600 | 375 | 275 | 200 | 140 | 90 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 1,430 | 1,100 | 700 | 425 | 320 | 220 | 150 | 115 | 70 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

**RufSCD_Jerk - Part 2**

| y/x | 2,200 | 2,400 | 2,600 | 2,800 | 3,000 | 3,001 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 7,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 6 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 8 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 10 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 12 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 14 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 16 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 18 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 20 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 22 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

## Initial Supporting table - RufSCD Jerk

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 26 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 28 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 30 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 32 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 34 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |
| 36 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 | 32,767 |

# Initial Supporting table - Misfire IMEP BinID Load Axis

**Description:** Cylinder LOAD for defining Y AXIS in Misfire_IMEP_BinID_versus_Speed_and_Load

**Value Units:** Indicated Mean Effective Pressure
**X Unit:** Bin ID row number

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50 | 125 | 175 | 225 | 275 | 325 | 375 | 425 | 475 | 525 | 600 | 700 | 825 | 975 | 1,175 | 1,425 | 1,675 |

# Initial Supporting table - Misfire_IMEP_BinID_RPM_Axis

**Description:** Cylinder RPM for defining the XAXIS in Misfire_IMEP_BinID_versus_Speed_and_Load

**Value Units:** RPM
**X Unit:** BinID Column number

| y/x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 775 | 1,075 | 1,325 | 1,575 | 1,825 | 2,075 | 2,325 | 2,575 | 2,825 |

# Initial Supporting table - Misfire_IMEP_BinID_vs_RPM_Load

**Description:** Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load "bin". Each Bin has has its own "bin ID". This Bin ID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table. The BinID tables Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

**Value Units:** Bin ID
**X Unit:** RPM range
**Y Units:** Cylinder Load Range

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 17 | 34 | 51 | 68 | 85 | 102 | 119 | 136 |
| 1 | 1 | 18 | 35 | 52 | 69 | 86 | 103 | 120 | 137 |
| 2 | 2 | 19 | 36 | 53 | 70 | 87 | 104 | 121 | 138 |
| 3 | 3 | 20 | 37 | 54 | 71 | 88 | 105 | 122 | 139 |
| 4 | 4 | 21 | 38 | 55 | 72 | 89 | 106 | 123 | 140 |
| 5 | 5 | 22 | 39 | 56 | 73 | 90 | 107 | 124 | 141 |
| 6 | 6 | 23 | 40 | 57 | 74 | 91 | 108 | 125 | 142 |
| 7 | 7 | 24 | 41 | 58 | 75 | 92 | 109 | 126 | 143 |
| 8 | 8 | 25 | 42 | 59 | 76 | 93 | 110 | 127 | 144 |
| 9 | 9 | 26 | 43 | 60 | 77 | 94 | 111 | 128 | 145 |
| 10 | 10 | 27 | 44 | 61 | 78 | 95 | 112 | 129 | 146 |
| 11 | 11 | 28 | 45 | 62 | 79 | 96 | 113 | 130 | 147 |
| 12 | 12 | 29 | 46 | 63 | 80 | 97 | 114 | 131 | 148 |
| 13 | 13 | 30 | 47 | 64 | 81 | 98 | 115 | 132 | 149 |
| 14 | 14 | 31 | 48 | 65 | 82 | 99 | 116 | 133 | 150 |
| 15 | 15 | 32 | 49 | 66 | 83 | 100 | 117 | 134 | 151 |
| 16 | 16 | 33 | 50 | 67 | 84 | 101 | 118 | 135 | 152 |

## Initial Supporting table - MisfireJ MEP_Th resh_vs_B inID

**Description:** Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_U_oad_Axis and Misfire_IMEP_BinID_RPM_Axis tables

**Value Units:** KPa
**XUnit:** BinID

**Misfire_IMEP_Thresh_vs_BinID - Part 1**

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | -666 | 5 | 20 | 20 | 35 | -5 | -5 | 5 | -666 | -666 | -666 | -666 | -666 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 2**

| y/x | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | 10 | 40 | 40 | 40 | 40 | 65 | 50 | 40 | 30 | 30 | 45 | -666 | -666 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 3**

| y/x | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | 15 | 20 | 30 | 30 | 10 | 20 | 5 | 50 | 40 | 40 | 50 | -666 | -666 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 4**

| y/x | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | 20 | 25 | 25 | 5 | 5 | 10 | 55 | 70 | 80 | 100 | 100 | 100 | -666 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 5**

| y/x | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | 10 | 10 | 20 | 20 | 25 | 45 | 60 | 75 | 75 | 90 | 110 | 140 | -666 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 6**

| y/x | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | 5 | 5 | 10 | 10 | 15 | 50 | 60 | 75 | 85 | 100 | 115 | 125 | 45 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 7**

| y/x | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | -666 | 25 | 30 | 50 | 50 | 65 | 75 | 100 | 105 | 110 | 120 | 125 | 145 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 8**

| y/x | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -666 | -666 | -666 | 10 | 20 | 20 | 50 | 80 | 90 | 105 | 105 | 110 | 115 | 170 | 170 | -666 | -666 |

**Misfire_IMEP_Thresh_vs_BinID - Part 9**

| y/x | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

## Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | \|-666 | I-666 | I-666 | \|20 | \|50 | \|50 | \|95 | \|95 | \|135 | \|145 | \|15O | \|165 | \|18O | \|200 | \|200 | I-666 | I-666 | |

# Initial Supporting table - P0191 - High fail limit of fuel control due to high pressure sensor skewed High

**Description:** High fail limit of fuel control due to high pressure sensor skewed High error as Function of desired pressure

**Value Units:** Ratio
**X Unit:** Desired Pressure (Mpa)

| y/x | 1.50 | 3.00 | 4.00 | 15.00 | 20.00 | 25.00 | 27.50 | 32.00 | 36.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.09 | 1.05 |

# Initial Supporting table - P0191 - Low fail limit of fuel control due to pressure sensor skewed low

**Description:** Low fail limit of fuel control due to pressure sensor skewed low error as Function of desired pressure

**Value Units:** Ratio
**X Unit:** Desired Pressure (Mpa)

| y/x | 1.50 | 3.00 | 4.00 | 15.00 | 20.00 | 25.00 | 27.50 | 32.00 | 36.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.92 | 0.95 |

## Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time

**Description:** Maximum injector closing time function of measured fuel rail pressure

**Value Units:** Injector Closing Time (us)
**X Unit:** Measrured Fuel Rail Pressure (MPa)

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 139 | 134 | 121 | 113 | 103 | 95 | 88 | 83 | 81 | 81 | 81 | 79 | 77 | 79 | 76 | 76 | 74 |

## Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude

**Description:** Maximum injector opening Magnitude voltage function of measured fuel rail pressure

**Value Units:** Opening Magnitude Voltage
**X Unit:** Measrured Fuel Rail Pressure (MPa)

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 | 924 |

## Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time

**Description:** Minimum injector closing time function of measured fuel rail pressure

**Value Units:** Injector Closing Time (us)
**X Unit:** Measrured Fuel Rail Pressure (MPa)

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 139 | 134 | 121 | 113 | 103 | 95 | 88 | 83 | 81 | 81 | 81 | 79 | 77 | 79 | 76 | 76 | 74 |

## Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude

**Description:** Minimum injector opening Magnitude voltage function of measured fuel rail pressure

**Value Units:** Opening Magnitude Voltage
**X Unit:** Measrured Fuel Rail Pressure (MPa)

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

## - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width

**Description:** Minimum injection pulse width function of measured fuel rail pressure where the voltage feedback measured from the analog to digital converter is rationalized

**Value Units:** Pulse Width (ms)
**X Unit:** Measrured Fuel Rail Pressure (MPa)

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

# Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

**Description:** Minimum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

**Value Units:** Minimum Small Pulse Compensation Fail Limit (ms)
**X Unit:** Measrured Fuel Rail Pressure (MPa)
**Y Units:** Injection Pulse With (ms)

**P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 1**

| y/x | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 1.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 2.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 3.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 5.00 | -0.12 | -0.12 | -0.12 | -0.13 | -0.13 | -0.14 | -0.14 | -0.14 | -0.15 | -0.15 | -0.16 |
| 7.00 | -0.06 | -0.06 | -0.07 | -0.07 | -0.08 | -0.08 | -0.08 | -0.09 | -0.09 | -0.10 | -0.10 |
| 9.00 | -0.05 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 | -0.08 | -0.08 | -0.08 | -0.09 | -0.09 |
| 11.00 | -0.04 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 | -0.08 | -0.08 |
| 12.00 | -0.03 | -0.04 | -0.04 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 |
| 13.00 | -0.03 | -0.04 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 |
| 14.00 | -0.03 | -0.04 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 |
| 16.00 | -0.03 | -0.04 | -0.04 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 |
| 18.00 | -0.04 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 | -0.08 |
| 19.00 | -0.04 | -0.04 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 | -0.08 |
| 20.00 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 | -0.08 | -0.08 |
| 21.00 | -0.04 | -0.04 | -0.05 | -0.05 | -0.06 | -0.06 | -0.07 | -0.07 | -0.07 | -0.08 | -0.08 |
| 24.00 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 | -0.08 | -0.08 | -0.08 | -0.09 |

**P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 2**

| y/x | 0.04 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.08 | 0.08 | 0.10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 1.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 2.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 3.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 5.00 | -0.16 | -0.16 | -0.17 | -0.17 | -0.18 | -0.18 | -0.18 | -0.19 | -0.19 | -0.20 | -0.20 |
| 7.00 | -0.10 | -0.11 | -0.11 | -0.12 | -0.12 | -0.12 | -0.13 | -0.13 | -0.14 | -0.14 | -0.16 |
| 9.00 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.12 | -0.12 | -0.12 | -0.13 | -0.13 | -0.15 |
| 11.00 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.11 | -0.11 | -0.11 | -0.12 | -0.12 | -0.14 |
| 12.00 | -0.08 | -0.08 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.11 | -0.11 | -0.11 | -0.13 |
| 13.00 | -0.08 | -0.08 | -0.08 | -0.09 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.13 |
| 14.00 | -0.08 | -0.08 | -0.08 | -0.09 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.13 |

## Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.00 | -0.08 | -0.08 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.11 | -0.11 | -0.11 | -0.13 |
| 18.00 | -0.08 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.12 | -0.14 |
| 19.00 | -0.08 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.11 | -0.11 | -0.11 | -0.12 | -0.14 |
| 20.00 | -0.08 | -0.09 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.12 | -0.12 | -0.14 |
| 21.00 | -0.09 | -0.09 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.12 | -0.12 | -0.14 |
| 24.00 | -0.09 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.12 | -0.12 | -0.12 | -0.13 | -0.15 |

**P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 3**

| y/x | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 1.00 | 1.50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 1.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 2.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 3.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 5.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 7.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 9.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 11.00 | -0.19 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 12.00 | -0.18 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 13.00 | -0.18 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 14.00 | -0.18 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 16.00 | -0.18 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 18.00 | -0.19 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 19.00 | -0.19 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 20.00 | -0.19 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 21.00 | -0.19 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |
| 24.00 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 | -0.20 |

# Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

**Description:** Maximum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

**Value Units:** Maximum Small Pulse Compensation Fail Limit (ms)
**X Unit:** Measrured Fuel Rail Pressure (MPa)
**Y Units:** Injection Pulse With (ms)

**P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 1**

| y/x | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 2.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 3.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 5.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 7.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 9.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 11.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 12.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 13.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 14.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 16.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 18.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 19.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 20.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 21.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 24.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |

**P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 2**

| y/x | 0.04 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.08 | 0.08 | 0.10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.40 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 2.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 3.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 5.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 7.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 9.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 11.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 12.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 13.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 14.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |

## Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 18.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 19.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 20.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 21.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 24.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 3** | | | | | | | | | | | |
| y/x | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 1.00 | 1.50 |
| 0.40 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 1.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 2.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 3.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 5.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 7.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 9.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 11.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 12.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 13.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 14.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 16.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 18.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 19.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 20.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 21.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| 24.00 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |

# Initial Supporting table - P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low

**Description:** The High Pressure Pump Control (HPC) fail threshold of pressure too low test as a function of desired fuel pressure.

**Value Units:** Pressure Error - Desired pressure - Actual Pressure (Mpa)
**X Unit:** Desired Pressure (Mpa)

| y/x | 2 | 3 | 4 | 15 | 20 | 25 | 28 | 32 | 36 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

# Initial Supporting table - P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high

**Description:** The High Pressure Pump Control (HPC) fail threshold for pressure too high test as a function of desired fuel pressure.

**Value Units:** Pressure Error - Desired pressure - Actual Pressure (Mpa)
**X Unit:** Desired Pressure (Mpa)

| y/x | 1.50 | 3.00 | 4.00 | 15.00 | 20.00 | 25.00 | 27.50 | 32.00 | 36.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | -5.00 | -5.00 | -5.00 | -5.00 | -5.00 | -5.00 | -5.00 | -5.00 | -5.00 |

## - P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F - kaFULO_n.RP

**Description:** Max Engine Speed to allow Multipulse function of injector energy profile

**Value Units:** Max Engine Speed to allow Multipulse
**X Unit:** Injector Energy Profile
**Y Units:** Multipulse Mode (0 = Double Pulse, 1 = Triple Pulse)

| y/x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| 0 | 3,600 | 3,600 | 3,600 | 3,600 |
| 1 | 3,000 | 3,000 | 3,000 | 3,000 |

•2E>01P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 De

**Description:** Opening Magnitude 2 Delta threshold to detect missing injection pulse

**Value Units:** Opening Magnitude 2 Delta Voltage
**X Unit:** Measured Fuel Rail Pressure

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |

## 0 1>2B01P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2

**Description:** Opening Magnitude 2 threshold to detect missing injection pulse

**Value Units:** Opening Magnitude 2 Voltage
**X Unit:** Measured Fuel Rail Pressure

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 |

## 00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitu ie r

**Description:** Opening Magnitude threshold to detect missing injection pulse

**Value Units:** Opening Magnitude Voltage
**X Unit:** Measured Fuel Rail Pressure

| y/x | 0.40 | 1.00 | 2.00 | 3.00 | 5.00 | 7.00 | 9.00 | 11.00 | 12.00 | 13.00 | 14.00 | 16.00 | 18.00 | 19.00 | 20.00 | 21.00 | 24.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

# Initial Supporting table - P0324_PerCyl_ExcessiveKnock_Threshold

**Description:** Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

**Value Units:** Filtered Knock Intensity. Unit-less term scaled from 0.0 (no knock) to 5.0 (maximum/large knock)
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |

# Initial Supporting table - P0325_P0330_OpenCktThrshMax (20 kHz)

**Description:** Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

**Value Units:** Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
**X Unit:** Engine Speed (RPM).
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.7383 | 11.6152 | 11.4727 | 11.1523 | 11.1816 | 11.2500 | 11.1133 | 10.0977 | 9.0000 | 7.9023 | 7.9023 | 7.9023 | 7.9023 | 7.9023 | 7.9023 | 7.9023 | 7.9023 |

# Initial Supporting table - P0325_P0330_OpenCktThrshMax (Normal Noise)

**Description:** Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

**Value Units:** Filtered background engine noise.  Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 2,700 | 2,900 | 3,000 | 3,250 | 3,500 | 3,750 | 4,000 | 4,250 | 4,500 | 4,750 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

# Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

**Description:** Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

**Value Units:** Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
**X Unit:** Engine (RPM)
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.2344 | 5.1875 | 5.1387 | 5.1641 | 4.9824 | 4.9941 | 5.0020 | 4.9277 | 4.7715 | 4.6172 | 4.2988 | 4.2988 | 4.2988 | 4.2988 | 4.2988 | 4.2988 | 4.2988 |

# Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

**Description:** Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

**Value Units:** Filtered background engine noise.  Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 2,700 | 2,900 | 3,000 | 3,250 | 3,500 | 3,750 | 4,000 | 4,250 | 4,500 | 4,750 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

# Initial Supporting table - P0325_P0330_OpenMethod_2

**Description:** Defines which Knock Open Circuit Diagnostic method to use.

**Value Units:** Identifies one of two diagnostic methods (either 20 kHz or Normal Noise) used (as a function of engine speed) for Open Circuit detection
**X Unit:** Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments (Index 0, 1, 2.... 16 = 500, 1000, 1500.... 8500 RPM)
**Y Units:** N/A

| **P0325_P0330_OpenMethod_2 - Part 1** | | | | | |
|---|---|---|---|---|---|
| y/x | 0 | 1 | 2 | 3 | 4 |
| 1 | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz |
| **P0325_P0330_OpenMethod_2 - Part 2** | | | | | |
| y/x | 5 | 6 | 7 | 8 | 9 |
| 1 | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_20KHz |
| **P0325_P0330_OpenMethod_2 - Part 3** | | | | | |
| y/x | 10 | 11 | 12 | 13 | 14 |
| 1 | CeKNKD_e_Open_20KHz | CeKNKD_e_Open_None | CeKNKD_e_Open_None | CeKNKD_e_Open_None | CeKNKD_e_Open_None |
| **P0325_P0330_OpenMethod_2 - Part 4** | | | | | |
| y/x | 15 | 16 | | | |
| 1 | CeKNKD_e_Open_None | CeKNKD_e_Open_None | | | |

# Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

**Description:** Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

**Value Units:** Boolean that indicates which engine cylinders are being used for the per-sensor Knock Performance diagnostic (0 = not used, 1 = used)
**X Unit:** Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order....)
**Y Units:** N/A

| y/x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

**Description:** Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOTin AFM mode

**Value Units:** Filtered background engine noise.  Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.609 | 1.609 | 1.609 | 1.645 | 1.546 | 1.560 | 1.459 | 1.517 | 1.519 | 1.410 | 1.459 | 1.459 | 1.459 | 1.459 | 1.459 | 1.459 | 1.459 |

# Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMax

**Description:** Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

**Value Units:** Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
**X Unit:** Engine Speed (RPM)
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.523 | 0.523 | 0.518 | 0.547 | 0.549 | 0.648 | 0.723 | 0.756 | 0.908 | 1.063 | 2.094 | 3.123 | 3.123 | 3.123 | 3.123 | 3.123 | 3.123 |

# Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMin

**Description:** Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

**Value Units:** Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
**X Unit:** Engine Speed (RPM).
**Y Units:** N/A

| y/x | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 5,500 | 6,000 | 6,500 | 7,000 | 7,500 | 8,000 | 8,500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.240 | 0.240 | 0.240 | 0.252 | 0.252 | 0.287 | 0.334 | 0.385 | 0.463 | 0.541 | 1.055 | 1.055 | 1.055 | 1.055 | 1.055 | 1.055 | 1.055 |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| GPS Signal Not Plausible | B1B44 | Monitors if the recieved GPS location is plausible.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have be satisfied<br><br>AND<br><br>The values within the Redundant GPS Array do not exactly match a sample within the Primary GPS Array | If the primary measurement for the following signals do not match the redundant version of these below signals:<br><br>-Lower Global Time Stamp<br>-Heading<br>-Elevation<br>-Longitude<br>-Latitude<br>-Signal Acquisition Time<br>-Calendar Year<br>-Calendar Day<br>-Time of Day<br>-Mode<br>-2D Absolute Position Error Estimate<br>-Absolute Heading Error Estimate<br>-Location Usable | Primary Precise Positioning System Data Group Communication Fault Active<br><br>Redundant Precise Positioning System Data Burst Group Communication Fault Active<br><br>Primary Precise Positioning System Data Group Data Recieved value changed from the previous excecution cycle<br>Diagnostic System Disabled is FALSE<br><br>Vehicle Power Mode<br><br>K_Integrity_Diagnostic_Enable is TRUE | = FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= ACCESSORY, RUN or PROPULSION<br><br>= TRUE | Continous | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value RGMXT05.333C | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| GPS Signal - Vehicle Speed not Plausible | B1B46 | Monitors if the recieved GPS speed is plausible.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have be satisfied<br><br>AND<br><br>There is a difference between the host vehicle GNSS calculated vehicle speed, and the vehicle speed calculated via the vehicle wheel speed sensors | abs(host vehicle GNSS calculated vehicle speed - the vehicle speed calculated via the vehicle wheel speed sensors) > K_LimitThreahold | Diagnostic System Disabled<br><br>Vehicle Power Mode<br><br>Primary Precise Positioning System Mode<br><br>Primary Precise Positioning System Location Usable<br><br>Primary Precise Positioning System Data Group Communication Fault Active<br><br>Primary Precise Positioning System Data Group Data Recieved<br><br>GPS Time Drift Diagnostic Fault Active<br><br>GPS Integrity Diagnostic Fault Active<br><br>Host Vehicle Velocity Invalidity<br><br>Host Vehicle Yaw Rate Invalidity is FALSE | = FALSE<br><br>= ACCESSORY, RUN or PROPULSION<br><br>= GNSS and RTXand DR, or GNSS and RTX and DR and MM<br><br>= TRUE<br><br>= FALSE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE | Continous | Safety Emissio ns Neutral Diagnost ics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor | C0061 | Monitors for faults of the High Performance IMU<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated | HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated | K_Communications_Fault _Pending<br><br>HP IMU Lateral Acceleration Correlation Status Loss of Communication Fault Active<br><br>HP IMU Lateral Acceleration Correlation Status Failed Safety Fault Active<br><br>HP IMU Lateral Acceleration Correlation Status Availability Indication<br><br>HP IMU Lateral Acceleration Correlation Status Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>Lateral Acceleration Correlation Diagnostic Communication Enable<br><br>HP IMU Signal Diagnostic Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Lateral_Acceleration_D iagnostic_Enable | = FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= 0<br><br>=TRUE | Continous | Safety Emissio ns Neutral Diagnost ics - Special Type C |
| | | | The diagnostic sub function shall record a | ■HPIMU Primary Lateral Acceleration | K_Communications_Fault -Pending | = FALSE | Continous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>any of the following are True:<br>■HPIMU Primary Lateral Acceleration Invalidity is Determined Invalid<br><br>■HPIMU Secondary Lateral Acceleration Invalidity is Determined Invalid | Invalidity is Determined Invalid<br><br>OR<br><br>HPIMU Secondary Lateral Acceleration Invalidity is Determined Invalid | HPIMU Primary Lateral Acceleration Loss of Communication Fault Active<br><br>HPIMU Primary Lateral Acceleration Availability Indication<br><br>HPIMU Primary Lateral Acceleration Failed Safety Fault Active<br><br>HPIMU Primary Lateral Acceleration Failed Safety Indication<br><br>HPIMU Secondary Lateral Acceleration Loss of Communication Fault Active<br><br>HPIMU Secondary Lateral Acceleration Availability Indication<br><br>HPIMU Secondary Lateral Acceleration Failed Safety Fault Active<br><br>HPIMU Secondary Lateral Acceleration Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>HP IMU Signal Diagnostic Enable<br><br>Lateral Acceleration | = FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>=Available<br><br>= FALSE<br><br>= FALSE<br><br>=TRUE<br><br>=TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Invalid Diagnostic Communication Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Lateral_Acceleration_Diagnostic_Enable | =TRUE<br><br>=0<br><br>=TRUE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor | C0062 | Monitors for faults of the High Performance IMU<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated | HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated | K_Communications_Fault _Pending<br><br>HP IMU Longitudinal Acceleration Correlation Status Loss of Communication Fault Active<br><br>HP IMU Longitudinal Acceleration Correlation Status Failed Safety Fault Active<br><br>HP IMU Longitudinal Acceleration Correlation Status Availability Indication<br><br>HP IMU Longitudinal Acceleration Correlation Status Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>Longitudinal Acceleration Correlation Diagnostic Communication Enable<br><br>HP IMU Signal Diagnostic Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Longitudinal _Acceleration_Diagnostic -Enable | = FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= 0<br><br>=TRUE | Continous | Safety Emissio ns Neutral Diagnost ics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>any of the following are True:<br>■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid<br><br>■HPIMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid | ■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid<br><br>OR<br><br>HPIMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid | K_Communications_Fault _Pending<br><br>HP IMU Primary Longitudinal Acceleration Loss of Communication Fault Active<br><br>HP IMU Primary Longitudinal Acceleration Availability Indication<br><br>HP IMU Primary Longitudinal Acceleration Failed Safety Fault Active<br><br>HP IMU Primary Longitudinal Acceleration Failed Safety Indication<br><br>HPIMU Secondary Longitudinal Acceleration Loss of Communication Fault Active<br><br>HPIMU Secondary Longitudinal Acceleration Availability Indication<br><br>HPIMU Secondary Longitudinal Acceleration Failed Safety Fault Active<br><br>HPIMU Secondary Longitudinal Acceleration Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>HP IMU Signal Diagnostic ■Enable | = FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>=Available<br><br>= FALSE<br><br>= FALSE<br><br>=TRUE<br><br>TRUE | Continous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Longitudinal Acceleration Invalid Diagnostic Communication Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Longitudinal _Acceleration_Diagnostic _Enable | =TRUE<br><br>=0<br><br>=TRUE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Yaw Rate Sensor | C0063 | Monitors for faults of the High Performance IMU<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>HP IMU Yaw Rate Correlation Status is Unknown or Not Correlated | HP IMU]Yaw Rate Correlation Status is Unknown or Not Correlated | K_Communications_Fault _Pending<br><br>HP IMU Yaw Rate Correlation Status Loss of Communication Fault Active<br><br>HP IMU Yaw Rate Correlation Status Failed Safety Fault Active<br><br>HP IMU Yaw Rate Correlation Status Availability Indication<br><br>HP IMU Yaw Rate Correlation Status Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>Yaw Rate Correlation Diagnostic Communication Enable<br><br>HP IMU Signal Diagnostic Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Y aw_Rate_D iagnostic_ Enable | = FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= 0<br><br>=TRUE | Continous | Safety Emissio ns Neutral Diagnost ics - Special Type C |
| | | | The diagnostic sub function shall record a | ■HPIMU Primary Yaw Rate Invalidity is | K_Communications_Fault -Pending | = FALSE | Continous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>any of the following are True:<br>■HPIMU Primary Yaw Rate Invalidity is Determined Invalid<br><br>■HPIMU Secondary Yaw Rate Invalidity is Determined Invalid | Determined Invalid<br><br>OR<br><br>HPIMU Secondary Yaw Rate Invalidity is Determined Invalid | HP IMU Primary Yaw Rate Loss of Communication Fault Active<br><br>HP IMU Primary Yaw Rate Availability Indication<br><br>HP IMU Primary Yaw Rate Failed Safety Fault Active<br><br>HP IMU Primary Yaw Rate Failed Safety Indication<br><br>HP IMU Secondary Yaw Rate Loss of Communication Fault Active<br><br>HP IMU Secondary Yaw Rate Availability Indication<br><br>HP IMU Secondary Yaw Rate Failed Safety Fault Active<br><br>HP IMU Secondary Yaw Rate Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>HP IMU Signal Diagnostic Enable<br><br>Yaw Rate Invalid Diaqnostic | = FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>=Available<br><br>= FALSE<br><br>= FALSE<br><br>=TRUE<br><br>=TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Communication Enable<br><br>Manufactures Enable Counter (MEC)<br><br>K_Yaw_Rate_Diagnostic_ Enable | =TRUE<br><br>=0<br><br>=TRUE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Inertial Sensor | C0520 | Monitors for controller faults of the High Performance IMU<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur. | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>AND<br><br>HP IMU Initialization Complete is False | HP IMU Initialization Timer > K_HP_IMU_Initialization_Delay | Diagnostic System Disabled<br><br>Vehicle Power Mode<br><br>Initialization Complete Diagnostic Communication Enable<br><br>iK_Common_Diag_Enable<br><br>K_Communications_Fault_Pending<br><br>HP IMU Initialization Complete Loss of Communication Fault Active<br><br>HP IMU Initialization Complete Availability Indication<br><br>HP IMU Initialization Complete Failed Safety Fault Active<br><br>HP IMU Initialization Complete Failed Safety Indication<br><br>HP IMU Reset Occurred Loss of Communication Fault Active<br><br>HP IMU Reset Occurred Availability Indication is Available<br><br>HP IMU Reset Occurred Failed Safety Fault Active | = FALSE<br><br>= Propulsion<br><br>= TRUE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= Active<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= Active<br><br>= FALSE | Continous | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | HPIMU Reset Occurred Failed Safety Indication | = FALSE | | |
| | | | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied and any of the following are TRUE:<br><br>■HPIMU Static Offset Calibration Status is Not Calibrated<br><br>All of the following are TRUE:<br><br>HP Inertial Sensor Static Offset Box Swap Detected is TRUE<br><br>HP Inertial Sensor Serial Number Received Value does not equal 0 | See malfunction criteria | K_Communications_Fault _Pending<br><br>HPIMU Static Offset Calibration Status Loss of Communication Fault Active<br><br>HPIMU Static Offset Calibration Status Availability Indication is<br><br>HPIMU Static Offset Calibration Status Failed Safety Fault Active<br><br>HPIMU Static Offset Calibration Status Failed Safety Indication is FALSE<br><br>HP IMU Common Diagnostic Enable<br><br>Static Offset Calibration Diagnostic Communication Enable i<br><br>Manufactures Enable Counter (MEC) is equal to 0<br><br>K_Common_Diag_Enable | = FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= 0<br><br>= TRUE | Continous | |
| | | | The diagnostic sub function shall record a failure if all of the following conditions are met..... | See malfunction criteria | K_Communications_Fault -Pending<br><br>HPIMU Orientation CalibrationStatueLoooof- | = FALSE | Continous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | The Enable Criteria have been satisfied and any of the following are TRUE:<br><br>HP IMU Orientation Calibration Status is not equal to K_Platform_Orientation<br><br>All of the following are TRUE:<br>HP Inertial Sensor Orientation Box Swap Detected is TRUE<br><br>HP Inertial Sensor Serial Number Received Value does not equal 0 | | Communication Fault Active<br><br>HP IMU Orientation Calibration Status Availability Indication is<br><br>HP IMU Orientation Calibration Status Failed Safety Fault Active<br><br>HP IMU Orientation Calibration Status Failed Safety Indication is FALSE<br><br>HP IMU Common Diagnostic Enable<br><br>Orientation Calibration Status Diagnostic Communication Enable<br><br>Manufactures Enable Counter (MEC) is equal to 0<br><br>K_Common_Diag_Enable | = FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= 0<br><br>= TRUE | | |
| | | | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied and any of the following are True:<br><br>HP IMU Primary Temperature Invalidity is set to TRUE | See malfunction criteria | K_Communications_Fault_Pending<br><br>HP IMU Primary Temperature Status Loss of Communication Fault Active<br><br>HP IMU Primary Temperature Status Availability Indication is<br><br>HP IMU Primary | = FALSE<br><br>= FALSE<br><br>= Available | Continous | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | HP IMU Secondary Temperature Invalidity is set to TRUE | | Temperature Status Failed Safety Fault Active | = FALSE | | |
| | | | | | HP IMU Primary Temperature Status Failed Safety Indication | = FALSE | | |
| | | | | | HP IMU Common Diagnostic Enable | = TRUE | | |
| | | | | | Primary Temperature Status Diagnostic Communication Enable | = TRUE | | |
| | | | | | HP IMU Secondary Temperature Status Loss of Communication Fault Active | = FALSE | | |
| | | | | | HP IMU Secondary Temperature Status Availability Indication is | = Available | | |
| | | | | | HP IMU Secondary Temperature Status Failed Safety Fault Active | = FALSE | | |
| | | | | | HP IMU Secondary Temperature Status Failed Safety Indication is FALSE | =FALSE | | |
| | | | | | HP IMU Common Diagnostic Enable | =TRUE | | |
| | | | | | Secondary Temperature Status Diagnostic Communication Enable | =TRUE | | |
| | | | | | Manufactures Enable Counter (MEC) is equal to 0 | = 0 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | K_Common_Diag_Enable | = TRUE | | |
| | | | The diagnostic sub function shall record a failure if all of the following conditions are met:<br><br>The Enable Criteria have been satisfied<br><br>HPIMU Low Voltage Detected is TRUE | Voltage <6V | K_Communications_Fault -Pending<br><br>HPIMU Low Voltage Loss of Communication Fault Active<br><br>HPIMU Low Voltage Status Availability Indication is<br><br>HPIMU Low Voltage Status Failed Safety Fault Active<br><br>HPIMU Low Voltage Status Failed Safety Indication<br><br>HP IMU Common Diagnostic Enable<br><br>K_Common_Diag_Enable<br><br>Low Voltage Diagnostic Communication Enable i | = FALSE<br><br>= FALSE<br><br>= Available<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>=TRUE | Continous | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| System Voltage Low | P0562 | Detects a low 12V system.<br><br>The DTC is set at 9V, however the emissions neutral default action of disabling adaptive cruise control will not occur until 5V (the voltage at which the CAN bus will fail). This is done to ensure safety critical features can operate at low voltage. | Run Crank voltage low and high | Battery Voltage <= 9.0 Volts | Run/Crank<br><br>Starter motor status<br><br>Diagnostic<br><br>Engine RPM | = Active<br><br>= Not Engaged<br><br>= Enabled<br><br>>= 600.0 RPM | 2.5 seconds out of a 3 seconds window<br><br>Diagnoistic runs every 100 ms | Safety Emissio ns Neutral Diagnost ics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Read Only Memory (ROM) | P0601 | This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and of SuperCruise will occur | The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations. | 1 failure if the fault is detected during the first pass.<br>5.00<br>failures if the fault occurs after the first pass is complete. | | | Diagnostic runs continuously in the background. | Safety Emissio ns Neutral Diagnost ics - Special Type C |
| | | | The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations. | 5<br>failures detected via Error Correcting Code | | | Diagnostic runs continuously via the flash hardware. | |
| | | | The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations. | 2 consecutive failures detected . | | | Diagnostic runs continuously. Will report a detected fault within 200 ms. | |
| | | | | In all cases, the failure count is cleared when controller shuts down | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Not Programmed | P0602 | Indicates the EOCM needs to be programmed.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | This DTC is set via calibration, when<br><br>KelDND_b_NoStartCal | =TRUE | Diagnoistic System is not in State of Reset. This includes:<br><br>-Code Clear in Process<br><br>-End of Trip Processing<br><br>-Diagnoistic Re-enable in Process | Diagnoistic System is not in State of Reset. | 1 second | Safety Emissio ns Neutral Diagnost ics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECM Long Term Memory Reset | P0603 | This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Static NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | Safety Emissio ns Neutral Diagnost ics - Special Type C |
| | | | Perserved NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | |
| | | | Perserved NVM region error detected during shut down. | | | | Diagnostic runs at controller power down. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECM RAM Failure | P0604 | Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >= | 3 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | Safety Emissions Neutral Diagnostics - Special Type C |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >= | 3 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >= | 3 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are > | 65,534 counts | | | Diagnostic runs continuously (background loop) | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECM Processor Integrity Fault | P0606 | Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Time new seed not received exceeded | | | always running | 0.400 seconds | Safety Emissions Neutral Diagnostics - Special Type C |
| | | | MAIN processor receives seed in wrong order | | | always running | 3 / 17 counts intermittent. 50 ms/count in the ECM main processor | |
| | | | 2 fails in a row in the MAIN processor's configuration register masks versus known good data | | | Testis Enabled: 1 (If 0, this test is disabled) | 12.5 to 25 ms | |
| | | | Checks number of stack over/under flow since last powerup reset >= | 5.00 | | Testis Enabled: 1 (If 0, this test is disabled) | variable, depends on length of time to corrupt stack | |
| | | | Safety critical software is not executed in proper order. | >= 1 incorrect sequence. | | Testis Enabled: 1 (If 0, this test is disabled) | Fail Table, f(Loop Time). See supporting tables: **P0606.PSW Sequence Fail f (Loop Time)** /<br><br>Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)**<br><br>counts<br><br>50 ms/count in | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | the ECM main processor | |
| | | | MAIN processor determines a seed has not changed within a specified time period within the 50ms task. | Previous seed value equals current seed value. | | Testis Enabled:<br>1<br>(If 0, this test is disabled) | Table, f(Loop Time). See supporting tables:<br>**P0606_Last Seed Timeout f (Loop Time)** | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECM Processor Integrity Performance | P0607 | Indicates that the ECM has detected an internal processor integrity performance.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Performs the failure diagnostic for the offline and online BIST results. | | | Testis enabled:<br>1 .<br><br>(If 0, this test is disabled) | 3 counts<br><br>background task/ count in the ECM main processor | Safety Emissio ns Neutral Diagnost ics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Powertrain Internal Control Module EEPROM Error | P062F | This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | HWIO reports that writing to NVM (at shutdown) will not succeed | | | | Diagnostic runs at controller power up. | Type D, SDA Safety Emissions Neutral Diagnostics - Special Type C |
| | | | HWIO reports the assembly calibration integrity check has failed | | | | Diagnostic runs at controller power up. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Processor Serial Peripheral Interface Bus | P30D6 | This diagnostic monitors for board level SPI errors between processors<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Failure is determined through the HWIOAPPL SPI Bus network status | 8 errors out of a 16 sample window | K_Internal_Control_Module_Processor_SPIBUS3_Enable<br><br>Vehicle Power Mode<br><br>When the diagnostic system is not in a short term/state of reset<br><br>Run crank ignition OR battery is in range<br><br>AND<br><br>The specified length of time has passed with the diagnostic enable criteria met | = TRUE<br><br>= RUN or PROPULSION<br><br>9< V< 16<br><br>After 0.00050 seconds | 0.05 seconds out of a 0.1 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Processor Serial Peripheral Interface Bus 3 | P30D8 | This diagnostic monitors for board level SPI errors between processors<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Failure is determined through the HWIOAPPL SPI Bus network status | 8 errors out of a 16 sample window | K_Internal_Control_Module_Processor_SPIBUS3_Enable<br><br>Vehicle Power Mode<br><br>When the diagnostic system is not in a short term/state of reset<br><br>Run crank ignition OR battery is in range<br><br>AND<br><br>The specified length of time has passed with the diagnostic enable criteria met | = TRUE<br><br>= RUN or PROPULSION<br><br>9< V< 16<br><br>After 0.00050 seconds | 0.05 seconds out of a 0.1 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Processor Serial Peripheral Interface Bus 4 | P30D9 | This diagnostic monitors for board level SPI errors between processors.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Failure is determined through the HWIOAPPL SPI Bus network status | 8 errors out of a 16 sample window | K_Internal_Control_Module_Processor_SPIBUS3_Enable<br><br>Vehicle Power Mode<br><br>When the diagnostic system is not in a short term/state of reset<br><br>Run crank ignition OR battery is in range<br><br>AND<br><br>The specified length of time has passed with the diagnostic enable criteria met | = TRUE<br><br>= RUN or PROPULSION<br><br>9< V< 16<br><br>After 0.00050 seconds | 0.05 seconds out of a 0.1 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| P3186 (Internal Control Module Security Peripheral Performance ) | P3186 | This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable. | MAC verification has falsely passed a configurable number of times. | 2.00 | Calibration enable | = True Boolean | | Type D, SDA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication on CAN Bus 2 Off | U0073 | A bus off condition has been detected for the CAN 2 Bus.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | This DTC monitors for a BUS off condition onCAN Bus | A failure is detected for 3 counts for 1000 ms | Vehicle Power Mode<br><br>EOCM Operational Condition<br><br>Diagnoistic Enabled<br><br>Supply Voltage | = RUN<br><br>= EOCM Comm Active State<br><br>= True<br><br>9 > V > 16V | 3 seconds out of a 5 seconds window<br><br>Diagnoistic runs every 1000 ms | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication on CAN Bus 1 Off | U0075 | A bus off condition has been detected for the CAN 1 Bus.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | This DTC monitors for a BUS off condition on CAN Bus | A failure is detected for 3 counts for 1000 ms | Vehicle Power Mode<br><br>EOCM Operational Condition<br><br>Diagnoistic Enabled<br><br>Supply Voltage | = RUN<br><br>= EOCM Comm Active State<br><br>= True<br><br>9 > V > 16V | 3 seconds out of a 5 seconds window<br><br>Diagnoistic runs every 1000 ms | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication on CAN Bus 8 Off | U007E | A bus off condition has been detected for the CAN 8 Bus.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | This DTC monitors for a BUS off condition on GM HS CAN Bus | A failure is detected for 3 counts for 1000 ms | Vehicle Power Mode<br><br>EOCM Operational Condition<br><br>Diagnoistic Enabled<br><br>Supply Voltage | = RUN<br><br>= EOCM Comm Active State<br><br>= True<br><br>9 > V > 16V | 3 seconds out of a 5 seconds window<br><br>Diagnoistic runs every 1000 ms | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Transmission Control Module | U0101 | This DTC monitors for a loss of communication with the tranmission.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>TrnsEstGrAuth<br><br>TrnsShftLvrPstnAuth<br><br>TEGP_TransCmndGrAuth | <br><br>>0.050 seconds<br><br>> 0.050 seconds<br><br>> 0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U010100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Interial Sesnsor | U0125 | This DTC monitors for a loss of communication with the tranmission.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>HPIDGJnitCmplt<br>HPIDG_LoVltgDtd<br>HPIDG-OrntnCalSts<br>HPIDG.PriTemp<br>HPIDG_RstOcc<br>HPIDG SecTemp<br>HPIDG_StcOfstCalSts<br>HPIDG-LatAccelCorrSts<br>HPIDP_LatAccel<br>HPIDS_LatAccel<br>HPIDG_LngAccelCorrSts<br>HPIDP_LngAccel<br>HPIDS_LngAccel<br>HPIDP_YawAccel<br>HPIDS_YawAccel<br>HPIDG_YawRateCorrSts<br>HPIDP_YawRate<br>HPIDS_YawRate | <br><br><br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds<br>>0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U012500_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Power Steering Control Module | U0131 | This DTC monitors for a loss of communication with the power steering system.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>DASTP_StrT rqAuth<br><br>SteeringTorqueOverlayDeliveredAuth<br><br>SteeringRequestDeliveredStatusAuth<br><br>EPSTTDP_TotTorqDlvdAuth<br><br>ArbitratedSteeringFeatureRequestActiveAuth<br><br>Steering WheelHandsOffDetectionConfidenceLevelAuth<br><br>Steering WheelHandsOffDetectionModeAuth<br><br>SWHOP_StAuth<br><br>SWIP_StrgWhlAngAuth<br><br>SWIP_StrgWhlAngCalStsAuth<br><br>SWI P_Strg WhlAngGradAuth | <br><br>> 0.05 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>>0.05seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.05 seconds<br><br>> 0.05 seconds<br><br>> 0.05 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U013100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition ora recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Body Control Module | U0140 | This DTC monitors for a loss of communication with the Body Control Module.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>DayNightStatusAuth<br><br>BrkPedlnitTirvlAchvd Auth<br><br>BrkPdIPosAuth<br><br>CP_CruzSecSwStatAuth<br><br>HSP_DrvAlrtTypCstCurrSetValAuth<br><br>HapticSeatActiveAuth<br><br>HSP_H ptcStOprtlStsAu th<br><br>HSP_HptcStPrsntAuth<br><br>TeenDrvActAuth<br><br>TransportStorageLogisticsModeActivation<br><br>VMMP_StatAuth | <br><br><br>> 0.25seconds<br><br>> 0.05seconds<br><br>> 0.05seconds<br><br>> 0.05seconds<br><br>>2.50 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U014000_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition ora recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communciation with Restraints Control Module | U0151 | This DTC monitors for a loss of communication with the restrains control module.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>LLDP_LatAccelAuth<br><br>LLDP_LatAccelSnsrCorrStsAuth<br><br>LLDP_LongAccelAuth<br><br>LLDP_LongAccelSnsrCorrStsAuth<br><br>DriverSeatBeltStatusAuth<br><br>PCIP_CruiseControlDisableRequestedAuth<br><br>YRP_YawRateAuth<br><br>YRP_YawRateCorrAuth | <br><br>>0.250 seconds<br><br>>0.250 seconds<br><br>>0.250 seconds<br><br>>0.250 seconds<br><br>> 2.50 seconds<br><br>> 2.50 seconds<br><br>> 0.050 seconds<br><br>> 0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U015100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Sensor Module - Long Range | U0235 | This DTC monitors for a loss of communication with the long range radar.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>LRRODP_Brst1_Prtctd<br><br>LRRODP_Brst2_Prtctd<br><br>LRRODP_Brst3_Prtctd<br><br>LRRODP_Brst4_Prtctd<br><br>LRRODP_Brst5_Prtctd<br><br>LRRODP_Brst6_Prtctd | <br><br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>>0.25 seconds<br><br>>0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U021100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communciation with Video Processing Module | U023C | This DTC monitors for a loss of communication with the video processing module<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur. | Message not Recieved from Controller for:<br><br>SrrndVsnRLSDatBrst<br><br>Aux1CameraConnectionStatus<br><br>Aux2CameraConnectionStatus | <br><br>>0.250 seconds<br><br>>0.250 seconds<br><br>>0.250 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U023C00_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Sensor Module - Short Range Left Front | U023D | This DTC monitors for a loss of communication with the short range radar.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>SRRLFODP_Brst1_Prtctd<br><br>SRRLFODP_Brst2_Prtctd<br><br>SRRLFODP_Brst3_Prtctd<br><br>SRRLFODP_Brst4_Prtctd<br><br>SRRLFODP_Brst5_Prtctd<br><br>SRRLFODP_Brst6_Prtctd | <br><br><br>> 0.20 seconds<br><br>> 0.20 seconds<br><br>>0.20 seconds<br><br>>0.20 seconds<br><br>> 0.20 seconds<br><br>> 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U023D00_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Sensor Module - Short Range Right Front | U023E | This DTC monitors for a loss of communication with the short range radar.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>SRRRFODP_Brst1_Prtctd<br><br>SRRRFODP_Brst2_Prtctd<br><br>SRRRFODP_Brst3_Prtctd<br><br>SRRRFODP_Brst4_Prtctd<br><br>SRRRFODP_Brst5_Prtctd<br><br>SRRRFODP_Brst6_Prtctd | <br><br><br>> 0.20 seconds<br><br>> 0.20 seconds<br><br>>0.20 seconds<br><br>>0.20 seconds<br><br>> 0.20 seconds<br><br>> 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U023E00_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Camera Module - Front | U0265 | This DTC monitors for a loss of communication with the front camera module.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>FCODP_Brst1_Prtctd<br><br>FCODP_Brst2_Prtctd<br><br>FCODP_Brst3_Prtctd<br><br>FCODP_Brst4_Prtctd<br><br>FCODP_Brst5_Prtctd<br><br>FCODP_Brst6_Prtctd<br><br>FCODP_Brst7_Prtctd<br><br>FCODP_Brst8_Prtctd<br><br>FCODP_Brst9_Prtctd<br><br>FCODP_Brst10_Prtctd | <br><br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>>0.25 seconds<br><br>>0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds<br><br>> 0.25 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U026500_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Engine Control Module | U0401 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>ActAxleTrqAuth<br><br>AdaptiveCruiseControlAxleTorqueCommandLimitingStateAuth<br><br>AdaptiveCruiseControlAxleTorqueCommandRequestStateAuth<br><br>CCEP_Auth<br><br>DrvIntndAxlTrqMxAuth<br><br>DrvIntndAxlTrqAuth<br><br>EngSpdAuth<br><br>PTSndBrkPdlPsAuth<br><br>PSP_EngRnngAuth<br><br>PSP_PrplSysActvAuth<br><br>AtTrnsCmndGrAuth<br><br>TrnsEstGrAuth<br><br>TrnsShftLvrPstnAuth<br><br>AccActPstAuth<br><br>AAP_AccelPedOvrrdActvAuth<br><br>VM11P_VehTopSpdLimArbdValAuth | <br><br>6 out of 10 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 1.5 seconds out of a 2.5 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | VMI1P_VehTopSpdLimModeActvAuth<br><br>VSADP_VehSpdAvgDrvnAuth<br><br>VSNDP_VehSpdAvgNDrvnAuth | 6 out of 10 messages<br><br>3 out of 4 messages<br><br>6 out of 10 messages | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Transmission Control Module | U0402 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>AtTrnsCmndGrAuth<br><br>TrnsEstGrAuth<br><br>TrnsShftLvrPstnAuth | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br><br><br>> 5 seconds<br><br><br><br>= 0 | 0.075 seconds out of a 0.125 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Electronic Brake Control Module | U0418 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>ABSAtvAuth<br><br>ABSFIdAuth<br><br>BrkPdIDrvAppPrsDetcdAuth<br><br>BrkPdIDrvAppIPresAuth<br><br>TCSP_ESCActvAuth<br><br>TCSP_ESCSysStsAuth<br><br>TC8P_ActvAuth<br><br>TCSP_DrvrIntntAuth<br><br>TCSP_FaildAuth<br><br>WhlAngVelLFrtAuth<br><br>WhlAngVelRFrtAuth<br><br>FWDECP_LFAuth<br><br>FWDECP_RFAuth<br><br>FWDECP_RstOccAuth<br><br>WhlAngVelLRrAuth<br><br>WhlAngVelRRrAuth<br><br>RWDECP_LRAuth<br><br>RWDECP_RRAuth | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.3 seconds out of a 0.4 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | RWDECP_RstOccAuth | 6 out of 10 messages | | | | |
| | | | EPBSP_ElecPrkBrkApplStsAuth | 3 out of 4 messages | | | | |
| | | | WRDSP_LFAuth | 3 out of 4 messages | | | | |
| | | | WRDSP_LRAuth | 3 out of 4 messages | | | | |
| | | | WRDSP_RFAuth | 3 out of 4 messages | | | | |
| | | | WRDSP_RRAuth | 3 out of 4 messages | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Power Steering Control Module | U0420 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>DASTP_StrTrqAuth<br><br>SteeringTorqueOverlayDeliveredAuth<br><br>SteeringRequestDeliveredStatusAuth<br><br>EPSTTDP_TotTorqDlvdAuth<br><br>SteeringAssistStatusAuth<br><br>SteeringAssistThermalInhibitedAuth<br><br>SteeringPerformanceActualModeAuth<br><br>SteeringTorqueRequestOverlayAvailableLeftAuth<br><br>SteeringTorqueRequestOverlayAvailableRightAuth<br><br>SteeringWheelAngleIntegrityStatusAuth<br><br>SteeringWheelTorqueIntegrityStatusAuth<br><br>ArbitratedSteeringFeatureRequestActiveAuth<br><br>SteeringWheelHandsOffDetectionConfidenceLevelAuth | <br><br>6 out of 10 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>6 out of 10 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.3 seconds out of a 0.4 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | SteeringWheelHandsOffDetectionModeAuth<br>SWHOP_StAuth<br>SWIP_StrgWhlAngAuth<br>SWIP_StrgWhlAngCalStsAuth<br>SWIP_StrgWhlAngGradAuth | 3 out of 4 messages<br>3 out of 4 messages<br>6 out of 10 messages<br>6 out of 10 messages<br>6 out of 10 messages | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Body Control Module | U0422 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>BrkPedlnitTirvlAchvd Auth<br><br>BrkPdIModTrvlAchAuth<br><br>BrkPdIPosAuth<br><br>CP_CruzSecSwStatAuth<br><br>CP_CruzSpdLmtrSwStatAuth<br><br>SPMP_SysPwrModeAuth | <br><br><br>6 out of 10 message<br><br>6 out of 10 message<br><br>6 out of 10 message<br><br>6 out of 10 message<br><br>6 out of 10 message<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 1.5 seconds out of a 2.5 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Instrument Panel Cluster | U0423 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>ACCSAAMSLP_TypAuth<br><br>ACCSAAMSLP_SpdLimCnfrmdAuth<br><br>ChimeSystemStateofHealthAuth<br><br>IPCDisplayStatusAuth<br><br>LaneFollowingChimeInterfaceFaultDetectedAuth<br><br>MCRLDOperationalStatusAuth | <br><br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 8 seconds out of a 10 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Radar Sensor Module - Long Range | U0433 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>LRRODP_Brst1_Prtctd<br><br>LRRODP_Brst2_Prtctd<br><br>LRRODP_Brst3_Prtctd<br><br>LRRODP_Brst4_Prtctd<br><br>LRRODP_Brst5_Prtctd<br><br>LRRODP_Brst6_Prtctd | <br><br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.03 seconds out of a 0.04 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Restraints Control Module | U0452 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>LLDP_LatAccelAuth<br><br>LLDP_LatAccelSnsrCorrStsAuth<br><br>LLDP_LongAccelAuth<br><br>LLDP_LongAccelSnsrCorrStsAuth<br><br>PCIP_CruiseControlDisableRequestedAuth<br><br>YRP_YawRateAuth<br><br>YRP_YawRateCorrAuth | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>8 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 8 seconds out of a 10 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C. |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Telematics Module | U0499 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur | An error has been detected on one of the following message:<br><br>RPPSD_Brst<br><br>RedundantPrecisePositioningSystemHeading<br><br>RedundantPrecisePositioningSystemLatitude<br><br>RedundantPrecisePositioningSystemLongitude | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br><br><br>> 5 seconds<br><br><br><br>= 0 | 8 seconds out of a 10 seconds window<br><br>(Based on the slowest signal tranmission) | Type D, SDA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From External Object Calculation Module 1 - Processor 2 | U053C | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur | An error has been detected on one of the following message:<br><br>H2H1DDG1_CRC8_FsFA<br><br>H2H1DDG2_CRC8_FsFA<br><br>H2H1DDG3_CRC8_FsFA<br><br>H2H1DDG4_CRC8_FsFA<br><br>H2H1DDG5_CRC16_FsFA<br><br>H2H1DDG6_CRC8_FsFA RPPSD_Brst | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br><br><br>> 5 seconds<br><br><br><br>= 0 | 8 seconds out of a 10 seconds window<br><br>(Based on the slowest signal tranmission) | Type D, SDA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Video Processing Module | U053D | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur | An error has been detected on one of the following message:<br><br>SrrndVsnRLSDatBrst<br><br>Aux1CameraConnectionStatus<br><br>Aux2CameraConnectionStatus | <br><br><br>6 out of 10 messages<br><br>6 out of 10 messages<br><br>6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br><br><br>> 5 seconds<br><br><br><br>= 0 | 8 seconds out of a 10 seconds window<br><br>(Based on the slowest signal tranmission) | Type D, SDA |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Camera Module - Front | U0566 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | An error has been detected on one of the following message:<br><br>SLVFSP_SpdLimVsnFsd SpdAuth<br><br>SLVFSP_NwDtdAuth<br><br>SLVFSP.UntAuth<br><br>FCODP_Brst1_Prtctd<br><br>FCODP_Brst2_Prtctd<br><br>FCODP_Brst3_Prtctd<br><br>FCODP_Brst4_Prtctd<br><br>FCODP_Brst5_Prtctd<br><br>FCODP_Brst6_Prtctd<br><br>FCODP_Brst7_Prtctd<br><br>FCODP_Brst8_Prtctd<br><br>FCODP_Brst9_Prtctd<br><br>FCODP_Brst10_Prtctd<br><br>FCODP_Brst11_Prtctd | <br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages<br><br>3 out of 4 messages | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9 < V < 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 3 seconds out of a 4 seconds window<br><br>(Based on the slowest signal tranmission) | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Sensor Module - Short Range Left Rear | U1126 | This DTC monitors for a loss of communication with the short range radar | Message not Recieved from Controller for:<br><br>SRRLRODP_Brst1_Prtctd<br><br>SRRLRODP_Brst2_Prtctd<br><br>SRRLRODP_Brst3_Prtctd<br><br>SRRLRODP_Brst4_Prtctd<br><br>SRRLRODP_Brst5_Prtctd<br><br>SRRLRODP_Brst6_Prtctd | <br><br><br>> 0.20 seconds<br><br>> 0.20 seconds<br><br>>0.20 seconds<br><br>>0.20 seconds<br><br>> 0.20 seconds<br><br>> 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U112600_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Sensor Module - Short Range Right Rear | U1127 | This DTC monitors for a loss of communication with the short range radar | Message not Recieved from Controller for:<br><br>SRRRRODP_Brst1_Prtctd<br><br>SRRRRODP_Brst2_Prtctd<br><br>SRRRRODP_Brst3_Prtctd<br><br>SRRRRODP_Brst4_Prtctd<br><br>SRRRRODP_Brst5_Prtctd<br><br>SRRRRODP_Brst6_Prtctd | <br><br>> 0.20 seconds<br><br>> 0.20 seconds<br><br>>0.20 seconds<br><br>>0.20 seconds<br><br>> 0.20 seconds<br><br>> 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U112700_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Short Range Sensor - Side Left Rear | U1150 | This DTC monitors for a loss of communication with the short range radar | Message not Recieved from Controller for:<br><br>SRRSLRODPB1P_AcqTmStmAuth | > 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U112700_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9 < V < 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Radar Short Range Sensor - Side RightRear | U1151 | This DTC monitors for a loss of communication with the short range radar | Message not Recieved from Controller for:<br><br>SRRSRRODPB1P_AcqTmStmAuth | > 0.20 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U112700_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9 < V < 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Radar Sensor Module - Short Range Left Front | U130F | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRLFODP_Brst1_Prtctd<br><br>SRRLFODP_Brst2_Prtctd<br><br>SRRLFODP_Brst3_Prtctd<br><br>SRRLFODP_Brst4_Prtctd<br><br>SRRLFODP_Brst5_Prtctd<br><br>SRRLFODP_Brst6_Prtctd | <br><br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Radar Sensor Module - Short Range Right Front | U1310 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRRFODP_Brst1_Prtctd<br><br>SRRRFODP_Brst2_Prtctd<br><br>SRRRFODP_Brst3_Prtctd<br><br>SRRRFODP_Brst4_Prtctd<br><br>SRRRFODP_Brst5_Prtctd<br><br>SRRRFODP_Brst6_Prtctd | <br><br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Radar Sensor Module - Short Range Left Rear | U1311 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRLRCODP_Brst1_Prtctd<br><br>SRRLRCODP_Brst2_Prtctd<br><br>SRRLRCODP_Brst3_Prtctd<br><br>SRRLRCODP_Brst4_Prtctd<br><br>SRRLRCODP_Brst5_Prtctd<br><br>SRRLRCODP_Brst6_Prtctd | <br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Radar Sensor Module - Short Range Right Rear | U1312 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRRRODP_Brst1_Prtctd<br><br>SRRRRODP_Brst2_Prtctd<br><br>SRRRRODP_Brst3_Prtctd<br><br>SRRRRODP_Brst4_Prtctd<br><br>SRRRRODP_Brst5_Prtctd<br><br>SRRRRODP_Brst6_Prtctd | 8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages<br><br>8 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Radar Short Range Sensor - Side Left Rear | U1366 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRSLRODPB1P_AcqTmStmAuth | 6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Radar Short Range Sensor - Side Right Rear | U1367 | This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations | An error has been detected on one of the following message:<br><br>SRRSRRODPB1P_AcqTmStmAuth | 6 out of 10 messages | Vehicle Supply Voltage<br><br>PNC.ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter<br><br>At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. | 9< V< 16<br><br>= True<br><br>> 5 seconds<br><br>= 0 | 0.4 seconds out of a 0.5 seconds window | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Gateway A on CAN 1 | U1607 | This DTC monitors for a loss of communication with the gateway module on CAN1<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise control and/or SuperCruise | Message not Recieved from Controller for:<br><br>ChimeManagerStatus | > 2.50 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U160700_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9 < V < 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communciation with Brake System Control Module on CAN 1 | U160F | This DTC monitors for a loss of communication with the brake controller on CAN1<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>ABSAtvAuth<br><br>ABSFIdAuth<br><br>BrkPdIDrvAppPrsDetcdAuth<br><br>BrkPdIDrvAppIPresAuth<br><br>TCSP_ESCActvAuth<br><br>TCSP_ESCSysStsAuth<br><br>TCSP_FaildAuth<br><br>WhlAngVelLFrtAuth<br><br>WhlAngVelRFrtAuth<br><br>FWDECP_LFAuth<br><br>FWDECP_RFAuth<br><br>FWDECP_RstOccAuth<br><br>WhlAngVelLRrAuth<br><br>WhlAngVelRRrAuth<br><br>RWDECP_LRAuth<br><br>RWDECP_RRAuth<br><br>RWDECP_RstOccAuth | <br><br>> 0.05 seconds<br><br>> 0.05 seconds<br><br>> 0.05 seconds<br><br>> 0.05 seconds<br><br>> 0.625 seconds<br><br>> 0.625 seconds<br><br>> 0.625 seconds<br><br>> 0.05 seconds<br><br>> 0.05 seconds<br><br>> 0.250 seconds<br><br>> 0.250 seconds<br><br>> 0.250 seconds<br><br>>0.05seconds<br><br>>0.05seconds<br><br>> 0.250 seconds<br><br>> 0.250 seconds<br><br>> 0.250 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U160F00_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communciation with Brake System Control Module on CAN 2 | U1610 | This DTC monitors for a loss of communication with the brake controller on CAN2.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>VAP_ActlVehAccelAuth<br><br>CBIP_ACCBrkgActvAuth<br><br>ACCPrfMdRq<br><br>ABSPr<br><br>EPBSP_ElecPrkBrkApplStsAuth<br><br>TBI2P_TrlrBrkgManAppAtvAuth<br><br>WRDSP_LFAuth | <br><br><br>> 0.30 seconds<br><br>> 0.05 seconds<br><br>> 2.50 seconds<br><br>> 2.50 seconds<br><br>> 0.25 seconds<br><br>> 0.30seonds<br><br>> 0.30 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U161000_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Engine Control Module on CAN2 | U1611 | This DTC monitors for a loss of communication with the engine control module on CAN 2.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | Message not Recieved from Controller for:<br><br>CollisionPreparationSystemAxleTorqueCommandRequestStateAuth<br><br>DrvIntndAxlTrqMnAuth<br><br>DrvIntndAxlTrqMxAuth<br><br>DrvIntndAxlTrqAuth<br><br>EngSpdAuth<br><br>TrnsEstGrAuth<br><br>TrnsShftLvrPstnAuth<br><br>AccActPstAuth<br><br>VSADP_VehSpdAvgDrvnAuth<br><br>VSNDP_VehSpdAvgNDrvnAuth<br><br>WhlDstPrRvlFrtAuth<br><br>WhlDstPrRvlRrAuth | <br><br>>0.250 seconds<br><br><br>>0.100 seconds<br><br>>0.100 seconds<br><br>> 0.100 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>> 0.050 seconds<br><br>>0.050 seconds<br><br>>0.250 seconds<br><br>>0.625 seconds<br><br>>2.50 seconds<br><br>>2.50 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U161100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with External Object Calculation Module 1 - Processor 2 on Ethernet | U1623 | This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur | Message not Recieved from Controller for:<br><br>H2H1DDG1_CRC8_LcFA<br><br>H2H1DDG2_CRC8_LcFA<br><br>H2H1DDG3_CRC8_LcFA<br><br>H2H1DDG4_CRC8_LcFA<br><br>H2H1DDG5_CRC16_LcFA<br><br>H2H1DDG6_CRC8_LcFA | <br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U161100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Telematics Control Platform on Ethernet | U1624 | This DTC monitors for a loss of communication with the TCP on internal ethernet.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur | Message not Recieved from Controller for:<br><br>PPP82DAbsolutePosition ErrorEstimate<br><br>PPPSAbsoluteHeadingErr orEstimate<br><br>PrimaryPrecisePositioning SystemCalendarDay<br><br>PrimaryPrecisePositioning SystemCalendarYear<br><br>PrimaryPrecisePositioning SystemElevation<br><br>PrimaryPrecisePositioning SystemHeading<br><br>PrimaryPrecisePositioning SystemLatitude<br><br>PrimaryPrecisePositioning SystemLocationUsable<br><br>PrimaryPrecisePositioning SystemLongitude<br><br>PrimaryPrecisePositioning SystemLowerGlobalTime Stamp<br><br>PrimaryPrecisePositioning SystemMode<br><br>PrimaryPrecisePositioning SystemSignalAcquisitionT ime | <br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U161100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | PrimaryPrecisePositioning SystemTimeofDay<br><br>PrimaryPrecisePositioning SystemllpperGlobalTime Stamp | >0.050 seconds<br><br>>0.050 seconds | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with External Object Calculation Module 1 - Processor 1 on Ethernet | U1625 | This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur | Message not Recieved from Controller for:<br><br>H1H2DDG1_CRC8<br><br>H1H2DDG2_CRC8<br><br>H1H2DDG3_CRC8<br><br>H1H2DDG4_CRC8<br><br>H1H2DDG5_CRC16<br><br>H1H2DDG6_CRC8 | <br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds<br><br>>0.050 seconds | Vehicle Supply Voltage<br><br>ECU Operating Conditions:<br><br>U161100_Enable<br><br>Exceptions:<br>If the vehicle is in Transport Mode<br><br>OR<br><br>Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.<br><br>OR<br><br>When a bus off condition (U007X) is Active | 9< V< 16<br><br>Any Partial Network that the ECU participates in is active<br><br>= True | See Threshold Values | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned / Authoritative Counter At Maximum | U1960 | This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | During controller initialization:<br><br>IF (Any Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(Any Authoritative Counter is at MAX value)<br><br>During controller operation:<br><br>IF (A Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(An Authoritative Counter is at MAX value) | | | Diagnostic Enabled:<br><br>KaSSAR_h_DiagEnableCals[1] == Enabled | | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1961 (Security Peripheral Performance ) | U1961 | This DTC indicates that the ECU security peripheral has reported that it has failed.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. | The ECU security peripheral reports that the security peripheral hardware has failed. | | | Diagnostic Enabled:<br><br>KaSSAR_h_DiagEnableCals[2] == Enabled | | Safety Emissions Neutral Diagnostics - Special Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1962 (Unable to Authenticate Serial Data Message) | U1962 | This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.<br><br>Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | Message authentication on a single key slot has failed a configurable number of times. | =>3 | | Diagnostic Enabled: 1.00 (True) | | Type D, SDA |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Hand Wheel Angle Sensor | C0051 | Monitors system angle sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |
| Hand Wheel Angle Sensor | C0051 | Monitors system angle sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |
| Hand Wheel Angle Sensor | C0051 | Monitors system angle sensor 2. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |
| Hand Wheel Angle Sensor | C0051 | Monitors system angle sensor 3. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |
| Hand Wheel Angle Sensor | C0051 | Monitors motor sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |
| Hand Wheel Angle Sensor | C0051 | Monitors motor sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops. | Failure to communicate with sensor, Protection value faults, sensor power supply faults. | Fault Detected | $1F1 (SYSTEMPOWERMODE)<br>$0C9 (ENGINE RUN ACTIVE)<br>DIAGNOSTICENABLED<br>Voltage | = RUN/ACC<br>= TRUE<br>TRUE<br>6V< voltage < 16V | 4ms (2 failures/ 2ms/sample) | Safety Emissions Neutral Diagnostic - Type C |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Bus Signal Failure | U007E | Control Module Communication CAN Bus 8 Off<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | CAN driver indicates a bus off condition has occurred | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U007E00_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>Power Mode | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds<br><br>= Run | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Lost Communication with Central Gateway Module | U0146 | Detects loss of communication between FCM_LC (Front Camera Module Low Content) and CGM (Central Gateway Module).<br><br>The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally.<br><br>The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | Monitored Messages:<br><br>CGM_CAN8_MSG05<br>CGM_CAN8_MSG03<br>CGM_CAN8_MSG01 | <br><br>= 2.5000 seconds (timeout)<br>= 2.5000 seconds (timeout)<br>= 0.0250 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U014600_ENABLE<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>DTC U007E00 | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>> 5 seconds<br><br>= Inactive | Monitored continuously while CAN frames are being transmitted and received<br><br>Fault maturation time is 02.5000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from Body Control Module | U0422 | Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Body Control Module (BCM).<br><br>The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally.<br><br>The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period<br><br>8ysPwrMode_Prtctd_MSG | <br><br>= 0.62500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Body Control Module (BCM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from Central Gateway Module | U0447 | Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Central Gateway Module (CGM).<br><br>The emissions neutral default action (described below) will only occur if both U0422 and LI0477 are triggered at the same time, otherwise the camera will function normally.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period<br><br>BkupSysPwrMode_P rtctd_MSG | = 0.62500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from External Object Calculating Module 1 | U053B | Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period<br><br>HstVehPathParms_Prtctd_M8G | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the External Object Calculation Module 1<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Lost Communication with External Object Calculating Module 1 on CAN Bus 8 | U1616 | Detects loss of communication between FCM_LC (Front Camera Module Low Content) and EOCM (External Object Calculating Module) on CAN bus 8.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | The following messages are monitored for late arrival and this code sets if a message times out<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U161600_ENABLE<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>DTC U007E00 | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>> 5 seconds<br><br>= Inactive | Monitored continuously while CAN frames are being transmitted and received<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned | U1960 | The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | The Authoritative Counter<br><br>Any single Key Slot Provision State Flag for Key 2 through to the final Key<br>AND<br>OBD Manufacturing Enable Counter<br><br>ERC_KEY_EMPTY | = Max Value<br><br>= 0<br><br>= 0<br><br>= TRUE | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanc<br>eDiagnosticPowerModeTime<br><br>U196000_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>All of the previous conditions plus any one of the following:<br><br>1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU oower uo. __ | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received. | Safety Non-MIL Emission neutral Diagnostic |
| Security Peripheral Performance - Performance or Incorrect Operation | U1961 | The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. | 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br><br>2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanc<br>eDiagnosticPowerModeTime<br><br>U196192_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Unable to Authenticate Serial Data Message | U1962 | Monitors incoming message authentification code and compares with the expected based on message source.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.<br><br>It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot<br><br>number of consecutive failures failures | ><br>k_ERRH_C_FailedAuthentication<br>Counter | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SerialDataAuthentificationPo<br>werModeTime<br><br>Fault Code U196192<br><br>U196200_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 2 seconds<br><br>= Inactive<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Front Camera Module Low Content Internal/Programming failures | U3000 | Control Module General Checksum Failure.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000. | Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected. | = Fault Detected | Vehicle Supply Voltage<br><br>U300041_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module General Memory Failure | General Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>U300042_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Data Memory Failure | a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred | = Fault Detected | Vehicle Supply Voltage<br><br>U300044_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Internal Electronic Failure | Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected<br>- BIST Fail<br>- Registier Check Error<br>- Internal Voltage Out of Range<br>- Internal Comm Error | = Fault Detected | Vehicle Supply Voltage<br><br>U300049_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Not Programmed | Application Data File Not Programmed CRC Calculated in Chunks - Missing Data | = Fault Detected | Vehicle Supply Voltage<br><br>U300051_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Startup | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Deactivated due to incorrect or invalid data provied to FCM OR Internal Falure (as listed) | -Bad or out of date vehicle yaw, or speed provided<br>-Imager timestamp indicates missing image<br>-EyeQ performs CRC check on program section of code in DDR RAM<br>-Internal data strcuture CRC mismatch<br>-Internal input signals storage corruption<br>-Stack Over/Underflow detection<br>-EyeQ challenge and response failure<br>-Clock Error<br>-All EyeQ messages stopped - Stale Data | = Fault Detected | Vehicle Supply Voltage<br><br>U300053_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Missing Calibration | Camera has not been calibrated or camera calibration process failed. Out of calibration | = Fault Detected | Vehicle Supply Voltage<br><br>U300054_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Not Configured | Sub system option content or vehilcle option content not programmed | = Fault Detected | Vehicle Supply Voltage<br><br>U300055_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Invalid Incompatible Configuration | Control Module or System Configuration not valid | = Fault Detected | Vehicle Supply Voltage<br><br>U300056_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Invalid Incompatible Software Component | Software component not compatible with detected hardware/software | = Fault Detected | Vehicle Supply Voltage<br><br>U300057_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Vehicle Identification Number | U3002 | Diagnostic detects VIN not programmed | This diagnostic shall fail if VIN stored in EEPROM contains all bytes such that:<br><br>VIN EEPROM | = OxFF | Vehicle Supply Voltage<br><br>Vehicle Power Mode<br><br>U300251_ENABLE<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= Run<br><br>= Enabled<br><br>= 0 | Startup | Safety Non-MIL Emission neutral Diagnostic |
| | | This diagnostic detects a VIN mismatch | Any digit of the programmed VIN does not match the digits of the VIN transmitted over the GMLAN. In addition, the VIN numbers programmed in EEPROM are NOT all OxFF'ssuch that:<br><br>VIN Stored<br>AND<br>VIN Stored | Does not equal VIN transmitted over GMLAN<br><br>Does not equal to OxFF | Vehicle Supply Voltage<br><br>Vehicle Power Mode<br><br>U300256_ENABLE<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= Run<br><br>= Enabled<br><br>= 0 | Startup | Safety Non-MIL Emission neutral Diagnostic |
| Battery Supply Voltage | U3003 | Battery Voltage - Circuit Voltage Below Threshold.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003. | Front Camera Module Low Content (FCM-LC) supply voltage (Vsup) | < 9.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300316_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Battery Voltage - Circuit Voltage Above Threshold | Front Camera Module Low Content (FCM_LC) supply voltage (Vsup) | > 16.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300317_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ethernet Bus 11 (+) | B1A09 | Monitoring for a failure of the Ethernet Bus connected to the HDLM<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Upon receipt of Link status =Down for a specific port for a calibratable amount of time | <1 second | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br># disabled | Continuosuly | Safety Non-MIL<br>Emission neutral<br>Diagnostic |
| Ethernet Bus 12 (+) | B1A0B | Monitoring for a failure of the Ethernet Bus connected to the HDLM<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Upon receipt of Link status =Down for a specific port for a calibratable amount of time | <1 second | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br># disabled | Continuosuly | Safety Non-MIL<br>Emission neutral<br>Diagnostic |
| Map Data Corrupted | B1BA5 | Monitors for a failure of the updated map pushed to the HDLM Modue<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | At startup, The updated map in memory fails the integrity check | Fault detected | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br>*t* disabled | The map age verification algorithm will RUN once on Power Up until it completes. | Safety Non-MIL<br>Emission neutral<br>Diagnostic |
| Map Information Not Updated | B2BA1 | The map data is not up to date<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | (current date) - (last successful map update) | >= calibration attribute MaxMapAge (6 months) | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br>*t* disabled | The map age verification algorithm will RUN once on Power Up until it completes. | Safety Non-MIL<br>Emission neutral<br>Diagnostic |
| Invalid Data Received from External Object Calculating Module 1 | U053B | Monitors for the intergrity of the data being received from the EOCM module | When the ECU has determined that the signal payload received has a failed safety, security (MAC), protection (PV) or continuous operation (ARC, Checksum) indication as per the signal status monitor | Fault detected | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br># disabled | Continuosuly | Safety Non-MIL<br>Emission neutral<br>Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Telematics Control Platform Module on Ethernet Bus | U1624 | Monitoring for a failure of the communication with the TCP Module on Ethernet<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Upon receipt of Link status =Down for a specific port for a calibratable amount of time | <1 second | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br># disabled | Continuosuly | Safety Non-MIL Emission neutral Diagnostic |
| Lost Communication with External Object Calculating Module 1 - Processor 1 on Ethernet Bus | U1625 | Monitoring for a failure of the communication with the EOCM Module on Ethernet<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Upon receipt of Link status =Down for a specific port for a calibratable amount of time | <1 second | Vehicle Power Mode:<br>VN Activation Conditions:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>COMM_ENABLE=HIGH<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br>*t* disabled | Continuosuly | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned | U1960 | The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | The Authoritative Counter<br><br>Any single Key Slot Provision State Flag for Key 2 through to the final Key<br>AND<br>OBD Manufacturing Enable Counter<br><br>ERC_KEY_EMPTY | = Max Value<br><br>= 0<br><br>= 0<br><br>= TRUE | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196000_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>All of the previous conditions plus any one of the following:<br><br>1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU power up.<br>3) Monitored whileRID 0x0200; Provision | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received. | Safety Non-MIL Emission neutral Diagnostic |
| Security Peripheral Performance - Performance or Incorrect Operation | U1961 | The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br><br>2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196192_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable To Authenticate Serial Data Message | U1962 | Monitors incoming message authentification code and compares with the expected based on message source.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.<br><br>It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot<br><br>number of consecutive failures failures | >k_ERRH_C_FailedAuthenticationCounter | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SerialDataAuthentificationPowerModeTime<br><br>Fault Code U196192<br><br>U196200_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 2 seconds<br><br>= Inactive<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Control Module | | General Checksum Failure | Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected. | = Fault Detected | Vehicle Supply Voltage<br><br>U300041_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | General Memory Failure | General Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>U300042_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Special Memory Failure | At startup, error in file server mount file Unable to perform file read/write operation on file system. After four retries to read/write all return fail | = Fault Detected | Vehicle Supply Voltage<br><br>U300043_ENABLE | 9V < voltage < 16V<br><br>= Enabled | At Start-up | Safety Non-MIL Emission neutral Diagnostic |
| | | Data Memory Failure | a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred | = Fault Detected | Vehicle Supply Voltage<br><br>U300044_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Program Memory Failure | working memory failure for embedded systems using ROM memory has occurred | = Fault Detected | Vehicle Supply Voltage<br><br>U300045_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Calibration / Parameter Memory Failure | In case a Data Flash memory failure is detected. | = Fault Detected | Vehicle Supply Voltage<br><br>U300046_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Watchdog and Safety Microcontroller Failure | In case a Data Flash memory failure is detected. | = Fault Detected | Vehicle Supply Voltage<br><br>U300046_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Supervision Software Failure | Failure of Safety MCU Software | = Fault Detected | Vehicle Supply Voltage<br><br>U300048_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | U3000 | Internal Electronic Failure | Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected<br>- BIST Fail<br>- Registier Check Error<br>- Internal Voltage Out of Range<br>- Internal Comm Error | = Fault Detected | Vehicle Supply Voltage<br><br>U300049_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Over Temperature | VPM internal temperature above threshold | 75C | Diagnostic_ENABLE = Enabled | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Not Programmed | Default Calibrations Stored. This is checked by verifying a specific signature is written at calibration section | Memory location is Set to OxFF or Calibration signature is not present | Vehicle Power Mode:<br>Supply Voltage<br>Virtual Network condition<br><br>Diagnostic_ENABLE | = RUN<br>= 9- 16V<br>= Any Virtual Network that the ECU participates in is active.<br># disabled | Once at power-up | Safety Non-MIL Emission neutral Diagnostic |
| | | Missing Calibration | Indicates faults related to operational software, calibrations, and options | = Fault Detected | Vehicle Supply Voltage<br><br>U300054_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Invalid Incompatible Software Componet | Incorrect software program | = Fault Detected | Vehicle Supply Voltage<br><br>U300057_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Signal Compare Failure | Signal comparison has failed within contrller | = Fault Detected | Vehicle Supply Voltage<br><br>U300062_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| Battery Voltage | U3003 | Battery Voltage - Circuit Voltage Below Threshold.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003. | Front Camera Module Low Content (FCM_LC) supply voltage (Vsup) | <9.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300316_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Battery Voltage - Circuit Voltage Above Threshold | Front Camera Module Low Content (FCM_LC) supply voltage (Vsup) | > 16.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300317_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication CAN Bus 8 Off | U007E | This DTC monitors for a BUS 8 off condition<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | CAN driver indicates a bus off condition has occurred | = Fault detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U007E00_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>Power Mode<br><br>OBD Manufacturing Enable Counter | 9V< voltage < 16V<br><br>= True<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds<br><br>= Run<br><br>= 0 | Monitored continuously while CAN frames are being transmitted and received<br><br>Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from Body Control Module | U0422 | Detects invalid data errors in messages received from the Body Control Module (BCM)<br><br>e.g. alive rolling count, checksum, MAC<br><br>The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>SysPwrMode_Prtctd_MSG | = 0.62500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>OBD Manufacturing Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Body Control Module (BCM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from Central Gateway Module | U0447 | Detects invalid data errors in messages received from the Central Gateway Module (CGM)<br><br>e.g. alive rolling count, checksum, MAC<br><br>The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>BkupSysPwrMode_Prtctd_MSG | = 0.625 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>OBD Manufacturing Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from External Object Calculating Module 1 | U053B | Detects invalid data errors in messages received from the External Object Calculating Module (EOCM)<br><br>e.g. alive rolling count<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the External Object Calculation Module 1<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Lost Communication with External Object Calculating Module 1 on CAN Bus 8 | U1616 | This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored for late arrival and this code sets if a message times out<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U161600_ENABLE<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>DTC U007E00<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>> 5 seconds<br><br>= Inactive<br><br>= 0 | Monitored continuously while CAN frames are being transmitted and received<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Key Table Not Provisioned | U1960 | The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The Authoritative Counter<br><br>Any single Key Slot Provision State Flag for Key 2 through to Key 20<br>AND<br>OBD Manufacturing Enable Counter<br><br>ERCKEYEMPTY | = Max Value<br><br>= 0<br><br>= 0<br><br>= TRUE | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformance DiagnosticPowerModeTime<br><br>U196000_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>All of the previous conditions plus any one of the following:<br><br>1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU power up.<br>3) Monitored whileRID 0x0200; Provision Security Peripheral General Keys is being executed | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Security Peripheral Performance - Performance or Incorrect Operation | U1961 | The confirmed status for this DTC indicates that the radar must be replaced due to an internal error<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The two following conditions lead to this failure:<br>1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br>2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br><br>These failures are detected by monitoring the following conditions updated by the security peripheral ERC function:<br>ERC_KEY_INVALID<br>ERC_BUSY<br>ERC_GENERAL_FAILURE<br>ERC_KEY_NOT_AVAILABLE<br>ERC_KEY_UPDATE_ERROR<br>ERC_KEY_WRITE_PROTECTED<br>ERC_MEMORY_FAILURE<br>ERC_NO_DEBUGGING<br>ERC_NO_SECURE_BOOT<br>ERC_SEQUENCE_ERROR | = Fault detected<br><br>For all ERC errors:<br>= True | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformance DiagnosticPowerModeTime<br><br>U196191_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received<br><br>DTC matures instantly | Safety Non-MIL Emission neutral Diagnostic |
| Unable To Authenticate Serial Data Message | U1962 | Monitors incoming message authentification code and compares with the expected based on message source<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.<br><br>It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot<br><br>number of consecutive failures failures | > k_ERRH_C_FailedAuthenticationCounter | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SerialDataAuthentificationPower ModeTime<br><br>Fault Code U196192<br><br>U196200_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 2 seconds<br><br>= Inactive<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Radar Internal/Programming failures | | Control Module General Failure - No Sub Type Information available.<br><br>Internal voltage problems, problems with the RF, ATIC or MCU power supply.<br><br>Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range.<br><br>Voltage UBATT (with CAT2 reaction)<br><br>Voltage UBATT Warn Level (UBATT_CHECK_CAT3)<br><br>Voltage 5V0_SMPS<br><br>Voltage 3V6_SMPS<br><br>Voltage ADC Bandgap 0<br><br>Voltage ADC Bandgap 1 | < 5.665V<br>or<br>> 27.811V<br><br>< 8.575V<br>or<br>> 16.503V<br><br>< 4.749V<br>or<br>> 5.240V<br><br>< 3.415V<br>or<br>> 3.776V<br><br>< 1.183V<br>or<br>> 1,255V<br><br>< 1.183V<br>or<br>> 1,255V | Vehicle Supply Voltage<br><br>U300000_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module General Checksum Failure | Radar Memory Checksum Failure occurs.<br><br>A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM. | = Fault detected | Vehicle Supply Voltage<br><br>U300041_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module General Memory Failure.<br><br>Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail. | The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash.<br><br>Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs | = Fault detected | Vehicle Supply Voltage<br><br>U300042_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Special Memory Failure.<br><br>Proposed to be a mild memory issue, i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost. | The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory. | = Fault detected | Vehicle Supply Voltage<br><br>U300043_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Internal Electronic Failure.<br><br>Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc. | Radar internal circuit failure occurs such as:<br><br>1) Multiple random access memory errors<br>2) Watchdog errors<br><br>These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures. | = Fault detected | Vehicle Supply Voltage<br><br>U300049_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Over Temperature | Radar RF internal temperature is above threshold such that it cannot operate effectively. | = Fault detected | Vehicle Supply Voltage<br><br>U30004B_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module not Programmed | Sensor operating software not sucessfully flashed on to the microcontroller | = Fault detected | Vehicle Supply Voltage<br><br>U300051_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | U3000 | Control Module Missing Calibration.<br><br>Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software. | Radar has not been calibrated or Radar calibration process failed indicated by:<br><br>k_default_calibration | = True | Vehicle Supply Voltage<br><br>U300054_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Not Configured.<br><br>Sensor has not yet completed a successful aiming process. | Radar sensor address has not been learned and locked in.<br><br>Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low) | = Fault detected | Vehicle Supply Voltage<br><br>U300055_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Invalid Incompatible Configuration.<br><br>APAR (application parameters) Calibration values are outside the valid calibration range. | Control Module or System Configuration not valid such that calibration values are outside the valid calibration range.<br><br>On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead. | = Fault detected | Vehicle Supply Voltage<br><br>U300056_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Invalid Incompatible Software Component.<br><br>The calibration table doesn't align properly and is no longer compatible with the OP software. | Software component not compatible with detected hardware/software.<br><br>For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered. | = Fault detected | Vehicle Supply Voltage<br><br>U300057_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Wrong mounting position - the radar is not mounted correctly | Absolute value of Angle Misalignment<br><br>Any of the following bits of Active Fault are set: | > k_Radar_Misalignment_Out_Of_Range<br><br>alignmentjYiode<br>horizontal_alignment_out_of_range<br>vertical_alignment_out_of_range<br>alignment_routine_failed_fault | Vehicle Supply Voltage<br><br>U300076_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault. | Learned address and current address position mismatch | Active_Fault.bit.sensor_addr_unstable_fault = TRUE | Vehicle Supply Voltage<br><br>U300095_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Component or System Operation Obstructed or Blocked.<br><br>This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects. | The operation of a component is prevented by an obstruction which trigers this fault.<br><br>This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected. | = Fault detected | Vehicle Supply Voltage<br><br>U300097_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Component or System Operating Condition.<br><br>For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures. | Radar internal temperature at threshold for the RF and internal MCU | = Fault detected | Vehicle Supply Voltage<br><br>U30009A_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or overvoltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Radar Power Circuit | U3003 | Battery Voltage - Circuit Voltage Below Threshold<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics | Radar supply voltage (Vsup) | < 9.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300316_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Battery Voltage - Circuit Voltage Above Threshold | Radar supply voltage (Vsup) | > 16.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active<br><br>U300317_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Multi Axis Accelerometer Performance | C006A | This sub type is used for failures where the control module has detected that the component performance is outside its expected range or operating in an incorrect way.<br><br>Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags. | One of the following IMU (Inertial Measuement Unit) failures occurs within the SDM (Sensing and Diagnostic module)<br><br>1) Sensor 1 Yaw Data<br>2) Sensor 2 Yaw Data<br>3) Sensor 1 Longitudinal Acceleration Data<br>4) Sensor 2 Longitudinal Acceleration Data<br>5) Sensor 1 Lateral Acceleration Data<br>6) Sensor 2 Lateral Acceleration Data<br><br>For 7,8,9 a correlation algorithm compares data from 2 separate IMUs (Inertial Measurement Unit) and fails if the sensor data sample by sample comparrisons are outside of tolerance<br><br>7) Yaw Data Correlation Failure YRP_YawRateCorrAuth<br>8) Longitudinal Acceleration Correlation Failure LLDP_LongAccelSnsrCorrStsAuth<br>9) Lateral Acceleration Correlation Failure LLDP_LatAccelSnsrCorrStsAuth | (1)to(6)<br>= Invalid<br><br>(7) to (9)<br>= $03 (Uncorrelated) | Vehicle Supply Voltage<br><br>C006A00_ENABLE | 9V< voltage < 16V<br><br>= Enabled | Within 0.05000 seconds | Safety Non-MIL Emission Neutral Diagnostic |
| Control Module Communication CAN Bus 1 Off | U0075 | This DTC monitors for a BUS 1 off condition.<br><br>Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags. | CAN driver indicates a bus off condition has occurred | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U007500_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>Power Mode | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds<br><br>= Run | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission Neutral Diagnostic |
| Sensing and Diagnostic Module Internal/Prog ramming failures | U3000 | SMI7xx - SPI interprocessor communications - open circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s<br><br>Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags. Applies to all DTC within U3000 | SPI diagnostic software detects an open circuit | = Fault Detected | DTC Calibration<br><br>SDM Power Mode<br><br>ECU Status<br><br>Supply Voltage | = Enabled<br><br>= Run/Propulsion<br><br>= Drive/Predrive<br><br>=6.0 <V< 18.0 | 0.003 seconds | Safety Non-MIL Emission Neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | SMI7xx - Chip external supply - open circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s | Voltage supply detects an open circuit | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 0.03 seconds | |
| | | SMI7xx - SPI interprocessor communications - short circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s | SPI diagnostic software detects an short circuit | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive/Predrive<br>=6.0 <V< 18.0 | 0.003 seconds | |
| | | SMI7xx - Chip external supply - short circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s | Voltage supply detects an short circuit | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 0.03 seconds | |
| | | SMI7xx - Chip external supply - Out-of-Range. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s | Voltage supply detects voltage out of range | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 0.03 seconds | |
| | | SMI7xx - Drift or oscillations or Offset in the valid range | 1) Error in Calculating IMU Offset<br>OR<br>2) When in drive mode if the saturation thresholds out of range for a period of time (3 seconds)<br>OR<br>3) When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data. | For 1) and 3) detected by SMI7xx Software.<br><br>For 2)<br>X Accel >1g<br>Y Accel > 1g<br>Yaw >40 deg/s | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 1) 1.042 s<br>2) 3 s<br>3) 0.04 s | |
| | | SMI7xx - Values stuck in valid range | IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Predrive<br>=6.0 <V< 18.0 | 3 occurances - diagnostic operates at start-up | |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data. | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status | = Enabled<br>= Run/Propulsion<br>= Drive | 0.04 s | |
| | | System Communication SPI - Aged data (delay, repeated data, re-sequencing) | IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Predrive<br>=6.0 <V< 18.0 | 3 occurances - diagnostic operates at start-up | |
| | | | IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data. | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status | = Enabled<br>= Run/Propulsion<br>= Drive | 0.04 s | |
| | | System Communication SPI - Corrupted Data (incorrect data, insertion of data, re-sequencing) | Corrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set. | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Predrive/Drive<br>=6.0 <V< 18.0 | 0.03 s | |
| | | System Communications SPI - Loss of Data | Sensor data is monitored for availability. If it is unavailable, an error condition will be set. | No data detected for fault threshold | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Predrive/Drive<br>=6.0 <V< 18.0 | 0.03 s | |
| | | System Communications SPI - 'Interrupted data (partial data transmit or no data transmit) | Interrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set. | = Fault Detected | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Predrive/Drive<br>=6.0 <V< 18.0 | 0.03 s | |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | SMI7xxx Power Supply | Under Voltage - The sensor monitors Vcc for under voltage and will set an error condition if a failure is detected. | < 3.13 V | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 0.03 s | |
| | | | Over Voltage - The sensor monitors Vcc for over voltage and will set an error condition if a failure is detected. | >3.47 V | DTC Calibration<br>SDM Power Mode<br>ECU Status<br>Supply Voltage | = Enabled<br>= Run/Propulsion<br>= Drive<br>=6.0 <V< 18.0 | 0.03 s | |
| Battery Supply Voltage | U3003 | Battery Voltage - Circuit Voltage Below Threshold<br><br>The DTC code will set at 9 V, however the emissions neutral default action of stopping tramissions of data, and disabling adaptive cruise control will not occur until ~5V, or whenever the SDM can no longer send CAN messages | Sensing and Diagnostic Module (SDM) supply voltage (Vsup) | < 9.0 +/-0.5 volts | Vehicle Power Mode = Run<br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br>U300316_ENABLE | > 5 seconds<br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission Neutral Diagnostic |
| | | Battery Voltage - Circuit Voltage Above Threshold | Sensing and Diagnostic Module (SDM) supply voltage (Vsup) | > 16.0 +/-0.5volts | Vehicle Power Mode = Run<br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br>U300317_ENABLE | > 5 seconds<br>= Enabled | 3.000 Seconds | |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication CAN Bus 8 Off | U007E | This DTC monitors for a BUS 8 off condition<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | CAN driver indicates a bus off condition has occurred | = Fault detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U007E00_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>Power Mode<br><br>OBD Manufacturing Enable Counter | 9V< voltage < 16V<br><br>= True<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds<br><br>= Run<br><br>= 0 | Monitored continuously while CAN frames are being transmitted and received<br><br>Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from Body Control Module | U0422 | Detects invalid data errors in messages received from the Body Control Module (BCM)<br><br>e.g. alive rolling count, checksum, MAC<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>SysPwrMode_Prtctd_MSG | = 0.62500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturing Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Body Control Module (BCM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from Central Gateway Module | U0447 | Detects invalid data errors in messages received from the Central Gateway Module (CGM)<br><br>e.g. alive rolling count, checksum, MAC<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>BkupSysPwrMode_Prtctd_MSG | = 0.625 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturing Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM)<br><br>Fault maturation time is 0.62500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from External Object Calculating Module 1 | U053B | Detects invalid data errors in messages received from the External Object Calculating Module (EOCM)<br><br>e.g. alive rolling count<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the External Object Calculation Module 1<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with External Object Calculating Module 1 on CAN Bus 8 | U1616 | This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | The following messages are monitored for late arrival and this code sets if a message times out<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>U161600_ENABLE<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>DTC U007E00<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>= Enabled<br><br>> 5 seconds<br><br>= Inactive<br><br>= 0 | Monitored continuously while CAN frames are being transmitted and received<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Radar Internal/Programming failures | | Control Module General Failure - No Sub Type Information available.<br><br>Internal voltage problems, problems with the RF, ATIC or MCU power supply.<br><br>Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. | Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range.<br><br>Voltage UBATT (with CAT2 reaction)<br><br>Voltage UBATT Warn Level (UBATT_CHECK_CAT3)<br><br>Voltage 5V0_SMPS<br><br>Voltage 3V6_SMPS<br><br>Voltage ADC Bandgap 0<br><br>Voltage ADC Bandgap 1 | < 5.665V<br>or<br>> 27.811V<br><br>< 8.575V<br>or<br>> 16.503V<br><br>< 4.749V<br>or<br>> 5.240V<br><br>< 3.415V<br>or<br>> 3.776V<br><br>< 1.183V<br>or<br>> 1.255V<br><br>< 1.183V<br>or<br>> 1.255V | Vehicle Supply Voltage<br><br>U300000_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module General Checksum Failure | Radar Memory Checksum Failure occurs.<br><br>A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM. | = Fault detected | Vehicle Supply Voltage<br><br>U300041_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module General Memory Failure.<br><br>Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail. | The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash.<br><br>Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs | = Fault detected | Vehicle Supply Voltage<br><br>U300042_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Special Memory Failure.<br><br>Proposed to be a mild memory issue, i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost. | The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory. | = Fault detected | Vehicle Supply Voltage<br><br>U300043_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Internal Electronic Failure.<br><br>Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc. | Radar internal circuit failure occurs such as:<br><br>1) Multiple random access memory errors<br>2) Watchdog errors<br><br>These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures. | = Fault detected | Vehicle Supply Voltage<br><br>U300049_ENABLE<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Over Temperature | Radar RF internal temperature is above threshold such that it cannot operate effectively. | = Fault detected | Vehicle Supply Voltage<br><br>U30004B_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module not Programmed | Sensor operating software not sucessfully flashed on to the microcontroller | = Fault detected | Vehicle Supply Voltage<br><br>U300051_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | U3000 | Control Module Missing Calibration.<br><br>Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software. | Radar has not been calibrated or Radar calibration process failed indicated by:<br><br>k_default_calibration | = True | Vehicle Supply Voltage<br><br>U300054_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Not Configured.<br><br>Sensor has not yet completed a successful aiming process. | Radar sensor address has not been learned and locked in.<br><br>Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low) | = Fault detected | Vehicle Supply Voltage<br><br>U300055_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Invalid Incompatible Configuration.<br><br>APAR (application parameters) Calibration values are outside the valid calibration range. | Control Module or System Configuration not valid such that calibration values are outside the valid calibration range.<br><br>On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead. | = Fault detected | Vehicle Supply Voltage<br><br>U300056_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Invalid Incompatible Software Component.<br><br>The calibration table doesn't align properly and is no longer compatible with the OP software. | Software component not compatible with detected hardware/software.<br><br>For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered. | = Fault detected | Vehicle Supply Voltage<br><br>U300057_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non -MIL Emission neutral Diagnostic |
| | | Wrong mounting position - the radar is not mounted correctly | Absolute value of Angle Misalignment<br><br>Any of the following bits of Active Fault are set: | > k_Radar_Misalignment_Out_Of_Range<br><br>alignment_mode<br>horizontal_alignment_out_of_range<br>vertical_alignment_out_of_range<br>alignment_routine_failed_fault | Vehicle Supply Voltage<br><br>U300076_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault. | Learned address and current address position mismatch | Active_Fault.bit.sensor_addr_unstable_fault = TRUE | Vehicle Supply Voltage<br><br>U300095_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | 0.10000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Comoonent/Svstem | Fault Code | Monitor Strateov Descriotion | Malfunction Criteria | Threshold Value | Secondarv Parameters | Enable Conditions | Time Reouired | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Component or System Operation Obstructed or Blocked.<br><br>This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects. | The operation of a component is prevented by an obstruction which trigers this fault.<br><br>This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected. | = Fault detected | Vehicle Supply Voltage<br><br>U300097_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Component or System Operating Condition.<br><br>For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures. | Radar internal temperature at threshold for the RF and internal MCU | = Fault detected | Vehicle Supply Voltage<br><br>U30009A_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Radar Power Circuit | U3003 | Battery Voltage - Circuit Voltage Below Threshold<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics | Radar supply voltage (Vsup) | < 9.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300316_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Battery Voltage - Circuit Voltage Above Threshold | Radar supply voltage (Vsup) | > 16.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active<br><br>U300317_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Performance | C0552 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 1 fail time,<br>50 millisecond update rate | > 0.0800 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 1 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence<br>gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 1 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 1 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br>< 0.70 %<br>> 50.0 Nm<br>> 0.0800 g<br><br>> 2.0 KPH<br>< 120.0 KPH | raw longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds,<br>50 millisecond update rate<br><br>region 1 fail time > 4.0 seconds out of region 1 sample time > 5.0 seconds,<br>50 millisecond update rate | Emissio ns Neutral Diagnost ic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ABS(raw longitudinal acceleration signal) update sample time<br><br>U0073 fault active<br>U0073 test fail this key on<br>DTCs not fault active | < 0.5300 g<br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 2 fail time,<br>50 millisecond update rate | > 0.0000 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 2 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal) | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate<br><br>region 2 fail time > 75.0 seconds<br>out of region 2 sample time > 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | update region 2 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal)<br>update sample time<br><br>U0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | <br>< 0.70 %<br>> 80.0 Nm<br>> 0.1500 g<br><br>> 0.0 KPH<br>< 0.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 3 fail time,<br>50 millisecond update rate | > 0.0000 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 3 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 0 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate<br><br>region 3 fail time > 75.0 seconds<br>out of region 3 sample time > 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 3 sample time:<br>brake pedal position<br>engine torque<br>ABS(TOSS vehicle speed acceleration)<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal)<br>update sample time<br><br>U0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | = FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br>< 0.70 %<br>> 80.0 Nm<br>< 0.1000 g<br><br>> 0.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | | |
| | | | ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)<br><br>update raw longitudinal acceleration signal fail time,<br>50 millisecond update rate<br><br>update raw longitudinal acceleration signal region 4 fail time,<br>50 millisecond update rate | > 0.1700 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br>region 3 specific enable<br><br>update raw lateral longitudinal acceleration signal stablity time:<br>TOSS vehicle speed<br>TOSS vehicle speed acceleration<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br>= 1 Boolean<br><br><br><br>> 15.0 KPH<br>< 0.5300 g<br><br>= TRUE<br><br><br>= TRUE<br>= TRUE | raw lateral longitudinal acceleration signal stability time > 10.0 seconds<br><br>raw longitudinal acceleration signal fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br>ABS(raw longitudinal acceleration signal)<br>AND<br>ABS(raw longitudinal acceleration signal)<br><br>update region 4 sample time:<br>brake pedal position<br>engine torque<br>TOSS vehicle speed acceleration<br>TOSS vehicle speed<br>TOSS vehicle speed<br><br>ABS(raw longitudinal acceleration signal)<br>update sample time<br><br>U0073 fault active<br>LI0073 test fail this key on<br>DTCs not fault active | = FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br>> 0.5300 g<br><br><br>< 3.8500 g<br><br><br><br>< 0.70 %<br>< 50.0 Nm<br>< -0.1700 g<br><br>> 2.0 KPH<br>< 120.0 KPH<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA<br>VehicleSpeedSensorError | region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Circuit Low | C0553 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | raw longitudinal acceleration signal when sensor type is directly proportional<br>OR<br>raw longitudinal acceleration signal when sensor type is inversely proportional<br><br>update raw longitudinal acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | < -3.8500 g<br><br>> -3.8500 g<br><br>(< 0.5 Q impedance between signal and controller ground) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw longitudinal acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | Emissions Neutral Diagnostic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Longitudinal Acceleration Sensor Circuit High | C0554 | Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g. | raw longitudinal acceleration signal when sensor type is directly proportional<br>OR<br>raw longitudinal acceleration signal when sensor type is inversely proportional<br><br>update raw longitudinal acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | > 3.8500 g<br><br>< 3.8500 g<br><br>(< 0.5 Q impedance between signal and controller power) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw longitudinal acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | Emissions Neutral Diagnostic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Circuit Low | C0697 | Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | raw lateral acceleration signal when sensor type is directly proportional<br>OR<br>raw lateral acceleration signal when sensor type is inversely proportional<br><br>update raw lateral acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | < -3.8500 g<br><br>> -3.8500 g<br><br>(< 0.5 Q impedance between signal and controller ground) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw lateral acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | Emissions Neutral Diagnostic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Circuit High | C0698 | Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | raw lateral acceleration signal when sensor type is directly proportional<br>OR<br>raw lateral acceleration signal when sensor type is inversely proportional<br><br>update raw lateral acceleration signal stability time, fail and sample time,<br>50 millisecond update rate | > 3.8500 g<br><br>< 3.8500 g<br><br>(< 0.5 Q impedance between signal and controller power) | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>sensor type is either directly proportional or inversely proportional<br><br>U0073 fault active<br>U0073 test fail this key on | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br>= CeLATR_e_VoltageDirectProp<br><br>= FALSE<br>= FALSE | raw lateral acceleration signal stability time > 30.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | Emissions Neutral Diagnostic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lateral Acceleration Sensor Performance | C0699 | Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds.<br><br>Emission neutral default state sets lateral acceleration signal = 0.0 g. | ABS(raw lateral acceleration signal)<br>AND<br>ABS(raw lateral acceleration signal)<br><br>update raw lateral acceleration signal fail, 50 millisecond update rate | > 0.5300 g<br><br><br>< 3.8500 g | battery voltage<br>run crank voltage<br>diagnostic monitor enable<br><br>update raw lateral acceleration signal stablity time:<br>TOSS vehicle speed<br>automatic transmission is clutch to clutch OR dual clutch<br>high side drive 1 enable<br>high side drive 2 enable<br>diagnsotic fault sequence gear active<br>P0716 fault active<br>P0716 test fail this key on<br>P0717 fault active<br>P0717 test fail this key on<br>P07BF fault active<br>P07BF test fail this key on<br>P07C0 fault active<br>P07C0test fail this key on<br>attained gear<br><br>ABS(raw lateral acceleration signal) update sample time<br><br>U0073 fault active<br>U0073 test fail this key on<br>DTCs not fault active | > 11.00 volts<br>> 11.00 volts<br>= 1 Boolean<br><br><br><br><br>> 15.0 KPH<br>= TRUE<br><br><br>= TRUE<br>= TRUE<br>= FALSE<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= 1st thru 10th<br><br>< 0.5300 g<br><br><br><br>= FALSE<br>= FALSE<br>VehicleSpeedSensor_FA | raw lateral acceleration signal stability time > 10.0 seconds,<br>fail time > 75.0 seconds<br>out of sample time > 120.0 seconds,<br>50 millisecond update rate | Emissio ns Neutral Diagnost ic - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Backup Transmission Range Command Message Counter Incorrect | C1201 | The diagnostic monitor detects an Alive Rolling Count (ARC) error or a two's compliment Protection Value (PV) error in the LIN bus frame containing the Electronic Transmission Range Selector (ETRS) backup transmission range command signal data. The ARC sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the ARC in this sequence manner. The receiving controller compares the most recent received ARC value to the previous value plus one. If the values are not equal, an ARC error has occurred. The PV is based on the two's compliment of the serial data frame critical data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the serial data message frame, the | rolling count value received from ECM/ CHCM and expected TCM calculated value not equal | = TRUE | service mode $04 active<br>battery voltage<br><br>ETRS ECM/CHCM frame recieved | = FALSE<br>> 11.00 volts<br><br>= TRUE | alive rolling count errors > 8 out of 10 sample counts | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | TCM calculates the PV, again based on the critical data parameters, in the receive message frame. If the TCM calculated PV does not equal the PV incorporated in the receive data message frame, a PV error has occurred. If continuous ARC errors or PV errors occur, the DTC is set. | | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Read Only Memory (ROM) | P0601 | This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code. | The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations. | 1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete. | | | Diagnostic runs continuously in the background. | Type A, 1 Trips |
| | | | The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations. | 254 failures detected via Error Correcting Code | | | Diagnostic runs continuously via the flash hardware. | |
| | | | | In all cases, the failure count is cleared when controller shuts down | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECU Long Term Memory Reset | P0603 | This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down. | Static NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | Type A, 1 Trips |
| | | | Perserved NVM region error detected during initialization | | | | Diagnostic runs at controller power up. | |
| | | | Perserved NVM region error detected during shut down. | | | | Diagnostic runs at controller power down. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| ECU RAM Failure | P0604 | Indicates that the TCM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously. | Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >= | 254 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | Type A, 1 Trips |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >= | 3 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >= | 5 counts | | | Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop) | |
| | | | Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are > | 65,534 counts | | | Diagnostic runs continuously (background loop) | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECU Processor Integrity Fault | P0606 | Indicates that the TCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. | Time new seed not received exceeded | | | always running | 500 milliseconds | Type A, 1 Trips |
| | | | MAIN processor receives seed in wrong order | | | always running | 18 / 17 counts intermittent. 50 ms/count in the TCM main processor | |
| | | | 2 fails in a row in the MAIN processor's ALU check | | | Test enabel calibration:<br>CPU 1 enabled = 0<br>CPU 2 enabled = 1<br>CPU 3 enabled = 0<br>CPU 4 enabled = 0<br>CPU 5 enabled = 0<br>CPU 6 enabled = 0<br>CPU 7 enabled = 0<br>CPU 8 enabled = 0<br><br>(If 0, this test is disabled) | 25 ms | |
| | | | 2 fails in a row in the MAIN processor's configuration register masks versus known good data | | | Test is Enabled:<br>1<br>(If 0, this test is disabled) | 12.5 to 25 ms | |
| | | | Checks number of stack over/under flow since last powerup reset >= | 5.00 | | Test is Enabled:<br>1<br>(If 0, this test is disabled) | variable, depends on length of time to corrupt stack | |
| | | | Voltage deviation > | 0.4950 | | Test is Enabled:<br>1<br>(If 0, this test is disabled) | 5 / 10 counts or 200<br><br>milliseconds continuous; 50 ms/count in the TCM main processor | |
| | | | Checks for ECC (error | 3 (results in MIL), | | Test is Enabled: | variable, | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECO error occured since last controller initialization. Counter >= | 5 (results in MIL and remedial action) | | 1<br>(If 0, this test is disabled) | depends on length of time to access flash with corrupted memory | |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL),<br>5 (results in MIL and remedial action) | | Test is Enabled:<br>1<br>(If 0, this test is disabled) | variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM | |
| | | | MAIN processor DMA transfer from Flash to RAM has 1 failure | | | Test is Enabled:<br>1<br>(If 0, this test is disabled) | variable, depends on length of time to write flash to RAM | |
| | | | Safety critical software is not executed in proper order. | >= 1 incorrect sequence. | | Test is Enabled:<br>**P0606 PFM_Enable f (Loop Time)**<br>(If 0, this test is disabled) | Fail Table, f(Loop Time). See supporting tables:<br>**P0606 PFM Sequence Fail f (Loop Time)**<br>/<br><br>Sample Table, f (Loop Time)See supporting tables: | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **P0606 PFM Sequence Sample f(Loop Time)**<br>counts<br><br>50 ms/count in the TCM main processor | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal ECU Processor Integrity Performance | P0607 | Indicates that the TCM has detected an internal processor integrity performance. | Performs the failure diagnostic for the offline and online BIST results. | | | Test is enabled: 1 . (If 0, this test is disabled) | 5 counts background task/ count in the TCM main processor | Type A, 1 Trips |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL), 5 (results in MIL and remedial action) | | Test is enabled: 1 . (If 0, this test is disabled) | variable, depends on length of time to access flash with corrupted memory | |
| | | | Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >= | 3 (results in MIL), 5 (results in MIL and remedial action) | | Test is enabled: 1 . (If 0, this test is disabled) | variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Internal Control Module Redundant Memory Performance , P060C = previous model years P16F3 | P060C | The diagnostic monitor is a rationalization of command values: command clutch pressures, command gear, and commanded direction. The monitor is broken up into three fault detection routines, command pressure (tie up) fault detection, command gear/shift fault detection, and commanded direction.<br><br>The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is | For each combination of clutches which can lead to an output lock:<br><br>Commanded Clutch PCS Pressure<br><br>OR<br><br>For each combination of clutches which can lead to a mult-clutch tie-up:<br><br>Commanded Clutch PCS Pressure | ><br>**Cmnd Tie Up Monitor Putput Lock Thresh**<br><br>**Clutch PCS Pressure Gain**<br>+<br>**Clutch PCS Pressure Offset**<br><br>transfer case range is 4WD Low:<br>>**Cmnd Tie Up Monitor Multi-Clutch Thresh fWD Lo**<br><br>**Clutch PCS Pressure Gain**<br>+<br>**Clutch PCS Pressure Offset**<br><br>Else<br>>**Cmnd Tie Up Monitor (Multi-Clutch Thresh**<br><br>**Clutch PCS Pressure Gain**<br>+ | | | when fail timer reaches 100, set DTC | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | rational, one or more of the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric.<br><br>The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and transfer case ranae | if above criteria met, increment fail timer by 3.125<br>6.25 ms update rate | **Clutch PCS Pressure Offset** | commanded tie up monitor enable calibration<br><br>vehicle speed<br>OR<br>commanded tie up fault pending<br>OR<br>(vehicle speed<br>AND<br>monitor enabled in previous loop)<br><br>High Side Driver 1 On<br>High Side Driver 2 On<br><br>Service Fast Learn<br>OR<br>(Service Fast Learn<br>AND<br>Vehicle Speed for vehicle speed time)<br><br>Number of fill factor conditions below which need to be met<br><br>Clutch 1 volume fill factor<br>Clutch 2 volume fill factor<br>Clutch 3 volume fill factor<br>Clutch 4 volume fill factor<br>Clutch 5 volume fill factor<br>Clutch 6 volume fill factor<br>SOWC volume fill factor (GF9 only) | = 1 (1 to enable, 0 to disable)<br><br>> 5.0 KPH<br><br>= TRUE<br><br>> 5.0 KPH<br><br>= TRUE<br><br>= TRUE<br>= TRUE<br><br>= FALSE<br><br>= TRUE<br><br>> 8.0 KPH<br>>2.50 seconds<br><br>= 4 Filled Clutches<br><br>> 1.00<br>> 1.00<br>> 1.00<br>> 1.00<br>> 1.00<br>> 1.00<br>> 1.00<br><br>Transfer case range is 4WD Lo: | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | The command direction fault detection is designed to verify the clutches commanded on will result in the commanded direction (e.g. reverse clutches are being commaned on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard. | | | output shaft deceleration<br><br>DTCs Not Fault Active<br><br>DTCs Not Test Failed This Key On | < -399.4 RPM/sec<br>Else<br>< -147.9 RPM/sec<br><br>P077C, P077D<br><br>P0723, P0722 | | |
| | | | Commanded Gear<br><br>AND at least one of the following:<br><br>Previous Loop Commanded Gear and current loop commanded<br><br>OR<br><br>current commanded gear and previous loop commanded gear<br><br>OR<br><br>incorrect downshift fail timer<br><br>if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate<br><br>Alternatively, if commanded gear increment invalid commanded gear fail | <<br>**Shift Monitor Lowest Allowed Gear**<br><br>> Current Loop Commanded Gear (i.e a downshift)<br>= a forward, locked gear<br><br>= a forward, locked gear<br># a forward, locked gear<br><br>>0.0<br><br>= NULL | | | when incorrect downshift fail timer reaches 4.63 sec, set DTC | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | timer<br>6.25 ms update rate | | command shift monitor enable calibration<br><br>Service Fast Learn<br>OR<br>(Service Fast Learn<br>AND<br>Vehicle Speed for vehicle speed time)<br><br>High Side Driver 1 On<br>High Side Driver 2 On<br><br>DTCs Not Fault Active<br><br>DTCs Not Test Failed This Key On | = 1 (1 to enable, 0 to disable)<br><br>= FALSE<br><br>= TRUE<br><br>> 8.0 KPH<br>>2.50 seconds<br><br>= TRUE<br>= TRUE<br><br>P077C, P077D, P0721<br><br>P0723, P0722, P172A, P172B | | |
| | | | Criteria based on driver requested range:<br><br>Drive:<br><br>An invalid combination of drive clutches commanded on*<br><br>driver requested range<br><br>Incorrect drive enable calibration<br><br>Incrorrect drive disable calibration<br><br>Reverse:<br><br>An invalid combination of reverse clutches commanded on* | **Illegal Drive Clutch = Combinations**<br><br>= Drive<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable)<br><br>=<br>**Illegal Reverse Clutch Combinations** | | | Fault pending fail timer<br>**Clutch Connectivity Wrong > Direction FP**<br><br>Fail time based on driver requested range:<br><br>**Incorrect Drive Fail Time**<br><br>**Incorrect Reverse Fail Time**<br><br>**Incorrect Neutral Fail Time**<br><br>**Incorrect Park Fail Time** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | driver requested range<br><br>Incorrect reverse enable calibration<br><br>Incrorrect reverse disable calibration<br><br>Neutral:<br><br>An invalid combinatio of neutral clutches commanded on*<br><br>driver requested range<br><br>Incorrect neural enable calibration<br><br>Incrorrect neutral disable calibration<br><br>Park:<br><br>An invalid combination of reverse clutches commanded on*<br><br>driver requested range<br><br>Incorrect park enable calibration<br><br>Incrorrect park disable calibration | = Reverse<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to enable)<br><br>=<br>**Illegal Park-Neutral Clutch Combinations**<br><br>= Neutral<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable)<br><br>=<br>**Illegal Park-Neutral Clutch Combinations**<br><br>= Park<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable) | Current driver requested range<br><br>(vehicle speed<br>AND<br>vehicle speed<br>OR<br>Fail Timer)<br><br>clutch connectivity monitor enable<br>OR<br>clutch connectivity monitor disable<br><br>Service Fast Learn<br>OR<br>(Service Fast Learn<br>AND<br>Vehicle Speed for vehicle speed time)<br><br>High Side Driver 1 On<br>High Side Driver 2 On<br><br>DTCs Not FaultActive<br><br>DTCs Not Test Failed This Key On<br><br>* Note, clutch is considered "on" when the following conditions are met:<br><br>Clutch commanded | = previous driver requested range<br><br>> -6.00 KPH<br><br>> 6.00 KPH<br><br>> 0.0<br><br>= 1 (1 to enable, 0 to disable<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>= TRUE<br><br>> 8.0 KPH<br>> 2.50<br><br>= TRUE<br>= TRUE<br><br>P077C, P077D, P0721<br><br>P0723, P0722, P172A, P172B<br><br>> | 6.25 ms update rate<br><br>><br>**Incorrect Direction Range Change Delay Time** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | pressure<br>Current clutch pressure command * 0.25<br>+<br>1st derivative of pressure command * 0.25<br>+<br>2nd derivative of pressure command * -0.25<br>+<br>3rd derivative of pressure command * -0.25 | **Clutch Connectivity C1 On Threshold**<br>OR<br>>**Clutch Connectivity C2 On Threshold**<br>OR<br>>**Clutch Connectivity C3 On Threshold**<br>OR<br>>**Clutch Connectivity C4 On Threshold**<br>OR<br>>**Clutch Connectivity C5 On Threshold**<br>OR<br>>**Clutch Connectivity C6 On Threshold**<br>OR<br>>**Clutch Connectivity C7 On Threshold**<br>= 0.0 OR > -1.00 kPa | | |
| | | | ratio monitor fault pending | = TRUE | If all conditions below are | | increment fail timer by | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Output speed direction<br>OR<br>Output speed direction<br><br>Plus following criteria based on driver requested range:<br><br>Drive:<br><br>driver requested range<br><br>Incorrect drive enable calibration<br><br>Incrorrect drive disable calibration<br><br>Reverse:<br><br>driver requested range<br><br>Incorrect reverse enable calibration<br><br>Incrorrect reverse disable calibration<br><br>Neutral:<br><br>driver requested range<br><br>Incorrect neural enable calibration<br><br>Incrorrect neutral disable calibration<br><br>Park:<br><br>driver requested range | = FORWARD<br><br>= REVERSE<br><br><br><br><br><br><br>= Drive<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable)<br><br><br><br>= Reverse<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to enable)<br><br><br><br>= Neutral<br><br>= 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable)<br><br><br><br>= Park | met, increment ratio monitor fault pending timer:<br><br>vehicle speed<br>OR<br>vehicle speed<br>(note: fault pending will remain latched if vehicle speed max thresholds are exceeded)<br><br>Monitor Armed<br><br>Measured output speed direction<br><br>Input speed default direction<br><br>Current driver requested range<br>for range time<br><br><br><br>based on PRNDL position:<br><br>driver requested range<br>AND<br>transmission measured speed ratio<br>AND<br>Loop-to-loop change in measured ratio<br>AND<br>(Direction By Ratio<br>OR<br>Direction Bv Clutch Slio) | > 0.50 AND< 6.00 KPH<br><br><-0.50 AND >-6.00 KPH<br><br><br><br><br><br>= TRUE<br><br>= REVERSE or FORWARD<br><br>= REVERSE or FORWARD<br><br>= previous driver requested range<br>><br>**Incorrect Direction Range Change Delay Time**<br><br><br><br>= Reverse<br><br>> 0.40<br><br>> -8.00<br><br>= FORWARD<br><br>= a FORWARD Gear | **Ratio Monitor Fail Increment Rate (Percent per Loop)**<br>when timer reaches 100, set fault pending<br><br>Fail time based on driver requested range (once fault pending has matured):<br><br>**Incorrect Drive Fail Time**<br><br>**Incorrect Reverse Fail Time**<br><br>**Incorrect Neutral Fail Time**<br><br>**Incorrect Park Fail Time**<br>6.25 ms update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Incorrect park enable calibration<br><br>Incrorrect park disable calibration | = 1 (1 to enable, 0 to disable)<br><br>= 0 (0 to enable, 1 to disable) | driver requested range<br>AND<br>transmission measured speed ratio<br>AND<br>Loop-to-loop change in measured speed ratio<br>AND<br>(Direction By Ratio<br>OR<br>Direction By Clutch Slip)<br>**********<br><br>Monitor Armed Enables:<br><br>if Range Shift enable cal:<br>THEN<br>Range Shift State<br>OR<br>if Attained Gear enable cal:<br>THEN<br>Attained Gear<br><br>ALSO<br>Engine Speed<br>Ratio Monitor enable cal<br>OR<br>Ratio Monitor disable cal<br>**********<br><br>Direction By Ratio:<br><br>(vehicle speed<br>OR<br>vehicle speed)<br><br>WHEN:<br>Measured output speed direction<br>AND | = Drive<br><br>< -0.40<br><br>< 8.00<br><br>= REVERSE<br><br>= REVERSE<br>**********<br><br>= 0 (1 to enable, 0 to disable)<br>= Range Shift Complete<br><br>= 0 ( 1 to enable, 0 to disable)<br><br># Neutral AND# Park<br><br>> 400 RPM<br>= 1 (1 to enable, 0 to disable)<br>= 0 (0 to enable, 1 to<br>$li§ i ?l J**********<br><br>> 0.50 KPH<br><br>< -0.50 KPH<br><br>= reverse | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Absolute measured gear ratio<br><br>THEN<br>Direction by Ratio<br><br>ELSE WHEN<br>Measured output speed direction<br>AND<br>Absolute measured gear ratio<br><br>THEN<br>Direction by Ratio<br>**********<br><br>Direction by Clutch Slip:<br><br>C1 clutch slip valid<br>C2 clutch slip valid<br>C5 clutch slip valid<br>C3C4 dual clutch slip valid<br>C3C6 dual clutch slip valid<br>C4C6 dual clutch slip valid<br><br>Direction by Clutch Slip Enable cal<br><br>(vehicle speed<br>OR<br>vehicle speed)<br><br>for each clutch:<br>current clutch slip<br><br>clutch held combination matches a valid aear in: | > 4.80 AND< 4.92<br><br>= REVERSE<br><br>= forward<br><br>> 4.65 AND< 0.66<br><br>**FORWARD ******* ******* **********<br><br>= TRUE<br>= TRUE<br>= TRUE<br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= 1 (1 to enable, 0 to disable)<br><br>> 0.50 KPH<br><br>< -0.50 KPH<br><br>**Ratio Monitor Slip < Threshold**<br>(if slip condition met, clutch held = 1, else held = 0)<br><br>**Ratio Monitor Clutch States** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ********** | ********** | | |
| | | | | | General enables: | | | |
| | | | | | Transmission Type | = RWD 10 Spd Automatic | | |
| | | | | | Service Fast Learn | = FALSE | | |
| | | | | | OR | | | |
| | | | | | (Service Fast Learn | = TRUE | | |
| | | | | | AND | | | |
| | | | | | Vehicle Speed for vehicle speed time) | > 8.0 KPH<br>>2.50 seconds | | |
| | | | | | High Side Driver 1 On | = TRUE | | |
| | | | | | High Side Driver 2 On | = TRUE | | |
| | | | | | DTCs Not Fault Pending | P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE | | |
| | | | | | DTCs Not Fault Active | P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783 | | |
| | | | | | DTCs Not Test Failed This Key On | P0721, P0722, P0723, P172A, P172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Powertrain Internal Control Module EEPROM Error | P062F | This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed. | HWIO reports that writing to NVM (at shutdown) will not succeed | | | | Diagnostic runs at controller power up. | Type A, 1 Trips |
| | | | HWIO reports the assembly calibration integrity check has failed | | | | Diagnostic runs at controller power up. | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Actuator Supply Voltage Circuit Low | P0658 | Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit. | < 0.5 Q impedance between signal and controller ground<br>OR<br>> 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count | (ground short diagnostic monitor enable calibration<br>OR<br>open circuit diagnostic monitor enable calibration)<br><br>high side drive ON<br>service mode $04 active | = 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br>= FALSE | ground short fail count > 6 counts within sample count of 2,400 counts<br>OR<br>open circuit fail count > 30 counts within sample count of 50 counts<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Torque Managment System - Forced Engine Shutdown | P06AF | This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring TCM. When the TCM does not receive a correct pattern or a missing pattern to the monitoring TCM, the DTC is set. | Received pattern from the TCM<br>OR<br>Received malfunction pattern | # expected pattern<br>>= 2 counts | Run Crank Active Time | Run or Crank<br>>= 500 milliseconds | 6/12 counts or 2,000 milliseconds continuous; 25 ms/count in the TCM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Fluid Temperature (TFT) Sensor Performance | P0711 | The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sesnor, and, raw transmission fluid temperature sesnor signal stuck in valid range. | raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed | < -6.7 °C | | | transmission fluid temperature warm up time > **transmission fluid temperature warm up time** seconds | Type B, 2 Trips |
| | | | | | diagnsotic monitor enable | = 1 Boolean | | |
| | | | | | P0712 NOT fault active | | | |
| | | | | | P0713 NOT fault active | | | |
| | | | | | battery voltage | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | run crank voltage | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | warm up test enable | = 1 Boolean | | |
| | | | | | TFT rationality diagnostic monitor enabled | = VeTFSR_b_TFT_RatlEnbl | | |
| | | | | | driver accelerator pdeal position | > 5.0 % | | |
| | | | | | engine torque | > 50.0 Nm | | |
| | | | | | engine speed | > 500.0 RPM | | |
| | | | | | vehicle speed | > 10.0 KPH | | |
| | | | | | engine coolant temperature | > -40.0 °C | | |
| | | | | | engine coolant temperature | < 150.0 °C | | |
| | | | | | raw transmission fluid temperature | > -273.0 °C | | |
| | | | | | raw transmission fluid temperature | < 150.0 °C | | |
| | | | | | P2818fault active | = FALSE | | |
| | | | | | P2818 test fail this key on | = FALSE | | |
| | | | | | DTCs not fault active | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | TFT Warmup Pass<br>P0711 test fail this key on | EngineTorqueEstInaccurate<br>AcceleratorPedalFailure<br>CrankSensor_FA<br>ECT_Sensor_FA<br>VehicleSpeedSensor_FA<br><br>= FALSE<br>= FALSE | | |
| | | | current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature,<br>update rate 100 milliseconds,<br>increment sample count | > 80.0 °C | | | sample count > 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time<br><br>fail time > 8.0 seconds out of sample time > 12.0 seconds | |
| | | | | | diagnsotic monitor enable<br>P0712 NOT fault active<br>P0713 NOT fault active<br>battery voltage | = 1 Boolean<br><br><br>>9.00 volts | <br><br><br>battery voltage time > 0.100 seconds | |
| | | | | | run crank voltage | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | intermittent test enable | = 1 Boolean | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | propulsion system active | = TRUE | | |
| | | | raw transmission fluid temperature - previous raw transmission fluid temperature,<br>update rate 100 milliseconds,<br>update fail time | < 0.0000 °C | diagnsotic monitor enable<br>P0712 NOT fault active<br>P0713 NOT fault active<br>battery voltage<br><br>run crank voltage<br><br>stuck in range test enable<br>propulsion system active<br>raw transmission fluid temperature<br>raw transmission fluid temperature | = 1 Boolean<br><br>>9.00 volts<br><br>>9.00 volts<br><br>= 1 Boolean<br>= TRUE<br>> -273.0 °C<br><br>< 150.0 °C | fail time > 600.0 seconds<br><br>battery voltage time > 0.100 seconds<br><br>run crank voltage time > 0.100 seconds | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Fluid Temperature Sensor Circuit Low Voltage | P0712 | Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value. | circuit resistance update fail time<br>1 seconds update rate | < 13.000 Q | diagnostic monitor enable<br>battery voltage<br>run crank voltage<br>run crank voltage in range time | = 1 Boolean<br>>9.00 volts<br>>9.00 volts | fail time > 5.00 seconds out of sample time > 6.00 seconds<br>1 seconds update rate<br>battery voltage in range time > 0.100 seconds<br>run crank voltage in range time > 0.100 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Fluid Temperature Sensor Circuit Low Voltage | P0713 | Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value. | circuit resistance update fail time<br>1 seconds update rate | >284,177.0 Q | diagnostic monitor enable<br>battery voltage<br>run crank voltage<br>run crank voltage in range time | = 1 Boolean<br>>9.00 volts<br>>9.00 volts | fail time > 5.00 seconds out of fail time > 6.00 seconds<br>1 seconds update rate<br>battery voltage in range time > 0.100 seconds<br>run crank voltage in range time > 0.100 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input Speed Sensor Performance | P0716 | Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM. | delta raw transmission input speed<br><br>delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed,<br>25 millisecond update rate | > 2,000.0 RPM | service mode $04 active<br>run crank voltage<br>diagnostic monitor enable<br>P0717 test fail this key on<br>P07BF test fail this key on<br>P07C0 test fail this key on<br>high side driver 1 enable<br>high side driver 2 enable<br>service fast learn active<br>run crank voltage<br><br>last valid raw transmission input speed<br>OR<br>valid raw transmission input speed<br>(before drop event)<br><br>last valid raw transmission input speed updates every 25 milliseconds when stablity time complete as long as<br>(delta raw transmission input speed<br>AND<br>raw transmission input speed)<br><br>raw transmission output speed<br>accelerator pedal position<br>engine torque<br>engine torque<br><br>transmission hydraulic pressure available:<br>engine speed | = FALSE<br>>9.00 volts<br>= 1 Boolean<br>= FALSE<br>= FALSE<br>= FALSE<br>= TRUE<br>= TRUE<br>= FALSE<br>> 5.00 volts<br><br>> 240.0 RPM<br><br>> 240.0 RPM<br><br>< 320.0 RPM<br><br>> 200.0 RPM<br><br>> 377.0 RPM<br><br>> 5.0 %<br>< 8,191.9 Nm<br>> 30.0 Nm<br><br>> 500.0 RPM | fail time > 1.500 seconds<br>updated fail event count,<br>fail event count > 5 counts,<br>25 millisecond update rate<br><br>raw transmission input speed time > 2.000 seconds<br><br>stability time > 0.100 seconds<br><br>engine speed time > | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | DTCs not fault active | AcceleratorPedalFailure<br>EngineTorqueEstInaccurate | **engine speed time for transmission hydraulic pressure available** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input Speed Sensor Circuit Low Voltage | P0717 | Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure. | raw transmission input speed<br>OR<br>TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE,<br><br>update fail time<br>25 millisecond update rate | < 168.0 RPM<br><br>< 250.0 RPM | service mode $04 active<br><br>diagnostic monitor enable<br>run crank voltage<br><br>service fast learn active<br>run crank voltage<br>P0722 fault active<br>P0723 fault active<br>P077C fault active<br>P077D fault active<br>brake pedal position sesnor must be OBDII to use brake pedal conditional<br>brake pedal position sesnor type<br>brake pedal position<br>P0716 test fail this key on<br>P07BF test fail this key on<br>P07C0 test fail this key on<br>accelerator pedal position<br>engine torque<br>engine torque<br>(transmission current attained gear<br>transmission current attained gear<br>raw transmission output speed<br>OR<br>transmission current attained gear<br>transmission current attained gear<br>raw transmission output speed)<br>P0717 fault active<br>P0717 test fail this key on | = FALSE<br><br>= 1 Boolean<br>>5.00 volts<br><br>= FALSE<br>>9.00 volts<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>= CeBRKR_e_OBD<br><br>< 70.0 %<br>= FALSE<br>= FALSE<br>= FALSE<br>> 5.0 %<br>>30.0 Nm<br>< 8,191.9 Nm<br><br>< CeCGSR_e_CR_Fourth<br><br>> CeCGSR_e_CR_First<br><br>> 250.0 RPM<br><br>< CeCGSR_e_CR_Tenth<br><br>> CeCGSR_e_CR_Fourth<br><br>> 377.0 RPM | fail time > 4.00 seconds<br><br>run crank voltage time > 25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | = FALSE | | |
| | | | | | TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when:<br>(P0722 fail time high gear exceeds fail threshold<br>OR<br>P0722 fail time low gear exceeds fail threshold) | = FALSE | | |
| | | | | | TISS/TOSS has single power supply calibration | | | |
| | | | | | TISS/TOSS single power supply test enabled | = 0 Boolean | | |
| | | | | | transmission hydraulic pressure available: | = 1 Boolean | engine speed time > **engine speed time for transmission hydraulic pressure available** | |
| | | | | | engine speed | > 500.0 RPM | | |
| | | | | | DTCs not fault active | EngineTorqueEstInaccurate | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Performance | P0721 | The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse. | TOSS raw direction<br>when TOSS transitional period = FALSE<br>AND<br>TOSS raw direction<br>when TOSS transitional period = FALSE<br>OR<br>TOSS raw<br>when TOSS transitional period = TRUE<br><br>update fail and sample time<br>6.26 millisecond update rate | ± FORWARD<br><br>± REVERSE<br><br>> 225.0 RPM | service mode $04 active<br>diagnostic monitor enable<br>TOSS count sample period<br>P0721 fault active<br>P0721 test fail this key on<br><br>TOSS transitional period detected = FALSE when:<br>on period<br>on period<br>when direction unknown<br>OR<br>on period<br>on period<br>when direction is reverse<br>OR<br>on period<br>on period<br>when direction is forward<br><br>TOSS transitional period detected = TRUE when:<br>on period<br>on period<br>when direction unknown<br><br>senor type is directional<br>senor type calibration | = FALSE<br>= 1 Boolean<br># 0 counts<br><br>= FALSE<br>= FALSE<br><br><br><br>> 0.4434 seconds<br>< 0.2773 seconds<br><br><br>< 0.2363 seconds<br>> 0.1240 seconds<br><br><br>< 0.0811 seconds<br>> 0.0088 seconds<br><br><br><br>< 0.4434 seconds<br>> 0.2773 seconds<br><br><br>= CeTOSR_e_Directional | fail time > 3.500 seconds<br>out of sample time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Circuit Low Voltage | P0722 | Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure. | raw transmission output speed,<br>update fail time<br>6.25 millisecond update rate<br><br>when:<br>attained gear<br><br>attained gear<br><br>AND<br>attained gear<br><br>use high gear fail time threshold<br>ELSE<br>use low gear fail time threshold | < 30.0 RPM<br><br>> CeCGSR_e_CR_First<br>< CeCGSR_e_CR_Tenth<br><br>> CeCGSR_e_CR_Fourth | service mode $04 active<br><br>diagnostic monitor enable<br><br>when neutral range occurs:<br>(garage shift<br>OR<br>PRNDL<br>OR<br>PRNDL<br>OR<br>range inhibit state)<br><br>{}{when not neutral range occurs:<br>attained gear<br>attained gear<br>(attained gear<br><br>engine torque hysteresis high<br>engine torque hysteresis low<br>accelerator pedal position hysteresis high<br>accelerator pedal position hysteresis low)<br><br>when not neutral range occurs:<br>(attained gear<br><br>engine torque hysteresis high<br>engine torque hysteresis low<br>accelerator pedal position hysteresis high<br>accelerator pedal position hysteresis low)} | = FALSE<br><br>= 1 Boolean<br><br>//COMPLETE<br><br>= PARK<br><br>= NEUTRAL<br><br># no inhibit active<br><br>> CeCGSR_e_CR_First<br>< CeCGSR_e_CR_Tenth<br>> CeCGSR_e_CR_Fourth<br>> 30.0 Nm<br><br>> 20.0 Nm<br><br>> 3.0 %<br><br>> 1.5 %<br><br>< CeCGSR_e_CR_Fourth<br>> 50.0 Nm<br><br>> 30.0 Nm<br><br>> 3.5 %<br><br>> 2.0 % | fail time >4.00 seconds high gear<br>OR<br>fail time > 3.00 seconds low gear<br><br>Engine Torque criteria met > 0.15 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | OR | | | |
| | | | | | {}{Wheel Speed Rationality Enable | = 1.00 Boolean | | |
| | | | | | AND | | | |
| | | | | | Transfer Case Range Valid | =TRUE | | |
| | | | | | AND | | | |
| | | | | | Vehicle Speed Fault | = FALSE | Wheel Speed Rationality met = 0 s | |
| | | | | | AND | | | |
| | | | | | Tease state | != Neutral | | |
| | | | | | AND | | | |
| | | | | | Wheel Speed Sensor Present | = TRUE | counts down from 0.25 s | |
| | | | | | AND | | | |
| | | | | | Output Speed calculate from wheel speed} | >= 100.00 rpm | | |
| | | | | | TISS/TOSS has single power supply calibration | = 0 Boolean | | |
| | | | | | AND | | | |
| | | | | | TISS | < 8,191.9 RPM | | |
| | | | | | AND | | | |
| | | | | | TISS) | > 250.0 RPM | | |
| | | | | | OR | | | |
| | | | | | TISS/TOSS has single power supply calibration | = 0 Boolean | | |
| | | | | | AND | | | |
| | | | | | TISS | < 8,191.9 RPM | | |
| | | | | | AND | | | |
| | | | | | TISS) | > 3,500.0 RPM | | |
| | | | | | P0716 test fail this key on | = FALSE | | |
| | | | | | P0717 test fail this key on | = FALSE | | |
| | | | | | P07BF test fail this key on | = FALSE | | |
| | | | | | P07C0 test fail this key on | = FALSE | | |
| | | | | | PTO check: | | | |
| | | | | | PTO enable calibration is FALSE | # 1 Boolean | | |
| | | | | | OR | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (PTO enable calibration is TRUE<br>AND<br>PTO active)<br><br>run crank voltage<br><br>service fast learn active<br>run crank voltage<br>transmission fluid temperature<br>P0723 test fail this key on<br>P077C test fail this key on<br>P077D test fail this key on<br>P0722 fault active<br>P0722 test fail this key on<br>transmission hydraulic pressure available:<br>engine speed<br><br>DTCs not fault active | = 1 Boolean<br><br>= TRUE<br><br>>5.00 volts<br><br>= FALSE<br>>9.00 volts<br>> -40.00 °C<br><br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>> 500.0 RPM<br><br>AcceleratorPedalFailure<br>EngineTorqueEstInaccurate | run crank voltage time > 25 milliseconds<br><br>engine speed time > **engine speed time for transmission hydraulic pressure available** | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Circuit Intermittent | P0723 | Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM. | delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed,<br>25 millisecond update rate<br><br>Failing criteria depends on below decision tree for failure threshold<br><br>If<br>4WD low engaged and wheel speed usage is not enabled<br>Else If<br>Wheel speed usage enabled for failing TOS drop diagnostic<br><br>Else<br>(Not 4WD and not Wheel Speed usage)<br><br>If<br>4WD low is engaged and Wheel speed usage enabled | > 1,755.0 RPM<br><br>**P0723 Wheel Speed Calc**<br>function of output speed<br><br>> 650.0 RPM<br><br>> Above threshold * 2.70 | service mode $04 active<br>diagnostic monitor enable<br><br>transmission engaged state<br><br>4WD low state<br><br>PTC check:<br>PTC enable calibration is FALSE<br>OR<br>(PTO enable calibration is TRUE<br>AND<br>PTO active)<br><br>run crank voltage<br><br>service fast learn active<br>run crank voltage<br>P077C test fail this key on<br>P077D test fail this key on<br><br>when PRNDL is moved to | = FALSE<br>= 1 Boolean<br><br># not engaged<br><br>= 4WD low state previous loop, 25 millisecond update rate<br><br># 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>>5.00 volts<br><br>= FALSE<br>>9.00 volts<br>= FALSE<br>= FALSE | fail time > 1.500 seconds updated fail event count,<br>fail event count > 5 counts,<br>25 millisecond update rate<br><br>transmission engaged state time > **P0723 (MY21) transmission engaged state time threshold**<br><br>4WD low change time > 3.0 seconds<br><br>run crank voltage time > 25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation: | | | |
| | | | | | PRNDL | = CeTRGR_e_PRNDL_Neutral | | |
| | | | | | OR | | | |
| | | | | | PRNDL | = CeTRGR_e_PRNDL_Transitionall | | |
| | | | | | OR | N-D transitional | | |
| | | | | | PRNDL | = CeTRGR_e_PRNDL_Transitional4 | | |
| | | | | | OR | R-N transitional | | |
| | | | | | raw transmission output speed | > 250.0 RPM | | |
| | | | | | OR | | | |
| | | | | | last valid raw transmission output speed | > 250.0 RPM | | |
| | | | | | determine if raw transmission input speed is stable: | | | |
| | | | | | ((raw transmission input speed - raw transmission input speed previous, 25 millisecond update | < 4,095.9 RPM | raw transmission input speed stability time > 2.00 seconds | |
| | | | | | AND | | | |
| | | | | | raw transmission input speed) | > 200.0 RPM | | |
| | | | | | OR | | | |
| | | | | | Wheel speed usage enabled for failing TOS drop diagnostic) | = TRUE | | |
| | | | | | OR | | | |
| | | | | | (TISS/TOSS has single cower suoolv calibration | = 0 Boolean | no time required | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>raw transmission input speed) | = 0.0 RPM | | |
| | | | | | select delta RPM fail theshold:<br>(4WD low state<br>AND4WD low valid)<br>select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold | = TRUE<br>= TRUE | | |
| | | | | | last valid raw transmission output speed<br>OR<br>valid raw transmission output speed<br>(before drop event) | > 36.0 RPM<br><br>> 36.0 RPM | raw transmission output speed time > 2.00 seconds | |
| | | | | | Wheel speed usage enabled for failing TOS drop diagnostic<br>AND<br>TOS - Calculated TOS from Wheel Speed | = TRUE<br><br>> 300.00 rpm | | |
| | | | | | last valid raw transmission output speed updates every 25 milliseconds when stablity time complete as long as<br>(delta delta raw transmission output speed<br>AND<br>raw transmission output speed) | < 140.0 RPM<br><br>> 36.0 RPM | stability time > 0.100 seconds | |
| | | | | | transmission hydraulic pressure available:<br>enaine speed_____ | > 500.0 RPM | engine speed time > | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | DTCs not fault active | AcceleratorPedalFailure<br>EngineTorqueEstInaccurate | **engine speed time for transmission hydraulic pressure available** | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Torque Converter Clutch (TCC) System Performance - GR10 specific | P0741 | The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. If the control valve is stuck, the torque converter will drain down, resulting in an excessive K factor above expected value | calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate | > **P0741 GR10 torque converter K factor fail limit** see supporting table | | | fail count > 4 counts in 75 count sample 25 millisecond update rate | Type A, 1 Trips |
| | | | | | diagnostic monitor enable | = 1 Boolean | | |
| | | | | | (TCC stuck off enable | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | TCC stuck on enable) | = 1 Boolean | | |
| | | | | | hydraulic pressure available: | | | |
| | | | | | engine speed | > 500.0 RPM | engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting table | |
| | | | | | battery voltage | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | run crank voltage | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | engine speed status | //INVALID | | |
| | | | | | PRNDL | //PARK | | |
| | | | | | PRNDL | //NEUTRAL | | |
| | | | | | Commanded Gear | //PARK | | |
| | | | | | Commanded Gear | //NEUTRAL | | |
| | | | | | transmission fluid temperature | > -6.66 °C | | |
| | | | | | transmission fluid temperature | < 130.0 °C | | |
| | | | | | engine speed | > 750.0 RPM | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | intrusive shift active<br>(intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821)<br>P0741 test fail this key on<br><br>range shift state<br><br>attained gear slip<br>engine torque<br>accelerator pedal position<br>accelerator pedal position<br><br>engine acceleration<br><br>transmission torque converter speed ratio (transmission turbine shaft speed / engine speed)<br><br>DTCs not fault active<br><br>DTCs not fault pending | = FALSE<br><br>= FALSE<br><br>= range shift complete (steady state gear)<br>< 75.0 RPM<br>> 25.00 Nm<br>> 1.00 %<br>< 100.0 %<br><br>> -200.0 RPM/sec<br><br>< 0.900<br><br>AcceleratorPedalFailure<br>EngineTorqueEstInaccurate<br>CrankSensor_FA<br>P281B, P281D, P281E, P0716, P0717, P07BF, P07C0<br>P0722, P0723, P077C, P077D<br><br>P0722, P0723, P0716, P0717, P07BF, P07C0 | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Stuck Off (GR10) | P0746 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C1 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use battery voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use run crank voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br>**********<br><br>enable C1 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator pedal position<br>OR | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R) clutch pressure control solenoid. | | | engine speed<br>OR<br>transmission input shaft speed)<br><br>C1 clutch slip speed valid<br><br>C1 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C1 clutch pressure has reached fully applied state<br><br>= 1 (1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0 (1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Stuck On | P0747 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | shift type is power down shift:<br>C1 clutch slip speed<br>OR<br>shift type is garage shift:<br>C1 clutch slip speed<br>ELSE<br>shift is another type:<br>C1 clutch slip speed<br><br>update fail time<br>6.25 milliscond update | <br><br>< 50.0 RPM<br><br><br>< 100.00 RPM<br><br><br>< 50.0 RPM | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.25<br><br>shift type is another type:<br>fail time > 0.150 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, GR10 C1 CB123456R, or 8 Speed C1 CB1278R clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C1 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C1 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350.0 kPa | all delay times<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C1 exhaust delay closed throttle lift foot up shift**<br><br>open throttle upshift:<br>**C1 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,191.8 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C2 Torque-Based Pressure Clip**<br>OR<br>**C3 Torque-Based Pressure Clip**<br>OR<br>**C4 Torque-Based Pressure Clip**<br>OR<br>**C5 Torque-Based Pressure Clip**<br>OR<br>**C6 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift tvoes: | **C1 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C1 exhaust delay closed throttle down shift**<br><br>negative torque upshift:<br>**C1 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C1 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br><br>**C2 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C3 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | garage shifts:<br>**Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C2 Clutch Clip Press CD Shifts**<br>**C3 Clutch Clip Press CD Shifts**<br>**C4 Clutch Clip Press CD Shifts**<br>**C5 Clutch Clip Press CD Shifts**<br>**C6 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **C4 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C5 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C6 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift type enable cal for aaraae shift | = TRUE<br><br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable, 1 will enable) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | = NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3P17C5 P0721<br>P172AP172B P0716<br>P0717 P07C0 P07BF | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 | | |
| | | | | | ********** | P172AP172B******* ******* ********** | | |
| | | | | | NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD durino an | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | automatic transmission shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.<br>OR | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | The automatic transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control ___ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Stuck Off (GR10) | P0776 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C2 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use battery voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use run crank voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br>**********<br><br>enable C2 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator pedal position<br>OR | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R) clutch pressure control solenoid. | | | engine speed<br>OR<br>transmission input shaft speed)<br><br>C2 clutch slip speed valid<br><br>C2 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C2 clutch pressure has reached fully applied state<br><br>= 1 (1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0 (1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Stuck On | P0777 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | shift type is power down shift:<br>C2 clutch slip speed<br>OR<br>shift type is garage shift:<br>C2 clutch slip speed<br>ELSE<br>shift is another type:<br>C2 clutch slip speed<br><br>update fail time<br>6.25 milliscond update | < 50.00 RPM<br><br>< 100.00 RPM<br><br>< 50.00 RPM | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.25<br><br>shift type is another type:<br>fail time > 0.15 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | <br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | <br><br><br><br><br>battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | <br><br><br><br>run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C2 CB29, GR10 C2 CB128910R, or 8 Speed C2 CB12345R clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C2 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C2 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350 kPa | all delay times<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C2 exhaust delay open throttle power on up shift**<br><br>open throttle upshift:<br>**C2 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,192 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C1 Torque-Based Pressure Clip**<br>OR<br>**C3 Torque-Based Pressure Clip**<br>OR<br>**C4 Torque-Based Pressure Clip**<br>OR<br>**C5 Torque-Based Pressure Clip**<br>OR<br>**C6 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift types:<br>aaraae shifts: | **C2 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C2 exhaust delay closed throttle down shift**<br><br>negative torque upshift:<br>**C2 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C2 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br><br>**C1 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C3 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C1 Clutch Clip Press CD Shifts**<br>**C3 Clutch Clip Press CD Shifts**<br>**C4 Clutch Clip Press CD Shifts**<br>**C5 Clutch Clip Press CD Shifts**<br>**C6 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **C4 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C5 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C6 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift type enable cal for garage shift<br>AND | = TRUE<br><br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable, 1 will enable) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | = NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3 P17C5 P0721<br>P172AP172B P0716<br>P0717 P07C0 P07BF<br>P0723 P0722 P077D | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 | | |
| | | | | | ********** | ■Kr* i ?**** ********** ** | | |
| | | | | | NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.<br>OR<br>The automatic | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Circuit Low | P077C | Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | < 0.2500 volts (< 0.5 Q impedance between signal and controller ground) | service mode $04 active<br>diagnostic monitor enable<br>P077D fault active<br>service fast learn<br><br><br><br><br>run crank voltage<br>battery voltage<br><br><br>P077C fault active<br>P077C test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br><br><br><br>> 10.00 volts<br>> 10.00 volts<br><br><br>= FALSE<br>= FALSE | fail time > 0.050 seconds, update fail count,<br>fail count > 16 counts<br>6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Circuit High | P077D | Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | > 4.7500 volts (< 0.5 Q impedance between signal and controller power) | service mode $04 active<br>diagnostic monitor enable<br>P077C fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>P077D fault active<br>P077D test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= FALSE<br>= FALSE | fail time > 0.050 seconds, update fail count,<br>fail count > 16 counts<br>6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Stuck Off (GR10) | P0796 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C3 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use battery voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use run crank voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br>**********<br><br>enable C3 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator pedal position<br>OR | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910) clutch pressure control solenoid. | | | engine speed<br>OR<br>transmission input shaft speed)<br><br>C3 clutch slip speed valid<br><br>C3 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C3 clutch pressure has reached fully applied state<br><br>= 1 (1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0 (1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Stuck On | P0797 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | shift type is power down shift:<br>C3 clutch slip speed<br>OR<br>shift type is garage shift:<br>C3 clutch slip speed<br>ELSE<br>shift is another type:<br>C3 clutch slip speed<br><br>update fail time<br>6.25 milliscond update | < 50.00 RPM<br><br>< 50.00 RPM<br><br>< 50.00 RPM | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.35<br><br>shift type is another type:<br>fail time > 0.15 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, GR10C3 C23457910, or 8 Speed C3C13567 clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C3 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C3 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350 kPa | all delay times<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C3 exhaust delay closed throttle lift foot up shift**<br><br>open throttle upshift:<br>**C3 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,192 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C1 Torque-Based Pressure Clip**<br>OR<br>**C2 Torque-Based Pressure Clip**<br>OR<br>**C4 Torque-Based Pressure Clip**<br>OR<br>**C5 Torque-Based Pressure Clip**<br>OR<br>**C6 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift types:<br>aaraae shifts: | **C3 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C3 exhaust delay closed throttle down shift**<br><br>negative torque upshift:<br>**C3 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C3 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br><br>**C1 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C2 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C1 Clutch Clip Press CD Shifts**<br>**C2 Clutch Clip Press CD Shifts**<br>**C4 Clutch Clip Press CD Shifts**<br>**C5 Clutch Clip Press CD Shifts**<br>**C6 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **C4 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C5 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C6 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift type enable cal for aaraae shift | = TRUE<br><br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable, 1 will enable) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | = NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3P17C5 P0721<br>P172AP172B P0716<br>P0717 P07C0 P07BF | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 | | |
| | | | | | ********** | P172AP172B******* ******* ********** | | |
| | | | | | NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD durino an | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | automatic transmission shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.<br>OR | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | The automatic transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control ___ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input/Turbine Speed Sensor A Circuit Low | P07BF | Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | < 0.2500 volts (< 0.5 Q impedance between signal and controller ground) | service mode $04 active<br>diagnostic monitor enable<br>P07C0 fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>P07BF fault active<br>P07BF test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= FALSE<br>= FALSE | fail time > 0.050 seconds, update fail count,<br>fail count > 16 counts<br>6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input/Turbine Speed Sensor A Circuit High | P07C0 | Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | > 4.7500 volts (< 0.5 Q impedance between signal and controller power) | service mode $04 active<br>diagnostic monitor enable<br>P07BF fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>P07C0 fault active<br>P07C0 test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= FALSE<br>= FALSE | fail time > 0.050 seconds, update fail count,<br>fail count > 16 counts<br>6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Upshift Switch Circuit | P0815 | Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.<br><br>Emissions neutral default, disables tap-up tap-down or manual-up manual-down. | switch state update fail time 1 100 millisecond update rate | = tap up (upshift) state active | service mode $04 active<br>diagnostic monitor enable<br><br>run crank voltage<br>run crank voltage time<br><br>run crank voltage<br>P1761 fault active<br>P0826 fault active<br>P0826 test fail this key on<br>P0826 fault pending<br>(P0815 fault active OR<br>P0815 fault active test fail this key on)<br>PRNDL range change time<br>PRNDL in range:<br>D1 OR<br>D2OR<br>D3OR<br>D4OR<br>D5OR<br>D6OR<br>D7OR<br>D8OR<br>D9OR<br>D10OR<br>NEUTRAL OR<br>PARK OR<br>REVERSE<br><br>DTCs not fault pending | = FALSE<br>= 1 Boolean<br><br>>5.00 volts<br>> 25 milliseconds<br><br>>9.00 volts<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>>1.00 seconds<br><br><br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 0 Boolean<br>= 0 Boolean<br>= 0 Boolean<br><br>Transmission Shift Lever Position Validity | fail time 1 > 1.00 seconds | Emissions Neutral Diagnostics - Type C |
| | | | switch state update fail time 2 100 millisecond update rate | = tap up (upshift) state active | service mode $04 active<br>diagnostic monitor enable<br><br>run crank voltage<br>run crank voltage time<br><br>run crank voltage<br>P1761 fault active | = FALSE<br>= 1 Boolean<br><br>>5.00 volts<br>> 25 milliseconds<br><br>>9.00 volts<br>= FALSE | fail time 2 > 120.00 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P0826 fault active<br>P0826 test fail this key on<br>P0826 fault pending<br>(P0815 fault active OR<br>P0815 fault active test fail this key on)<br>PRNDL range change time<br>PRNDL in range:<br>D1 OR<br>D2OR<br>D3OR<br>D4OR<br>D5OR<br>D6OR<br>D7OR<br>D8OR<br>D9OR<br>D10OR<br>NEUTRAL OR<br>PARK OR<br>REVERSE<br><br>DTCs not fault pending | = FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>> 1.00 seconds<br><br><br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 0 Boolean<br>= 0 Boolean<br>= 0 Boolean<br><br>Transmission Shift Lever Position Validity | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Downshift Switch Circuit | P0816 | Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.<br><br>Emissions neutral default, disables tap-up tap-down or manual-up manual-down. | switch state update fail time 1 100 millisecond update rate | = tap down (downshift) state active | service mode $04 active<br>diagnostic monitor enable<br><br>run crank voltage<br>run crank voltage time<br><br>run crank voltage<br>P1761 fault active<br>P0826 fault active<br>P0826 test fail this key on<br>P0826 fault pending<br>(P0816 fault active OR<br>P0816 fault active test fail this key on)<br>PRNDL range change time<br>PRNDL in range:<br>D1 OR<br>D2OR<br>D3OR<br>D4OR<br>D5OR<br>D6OR<br>D7OR<br>D8OR<br>D9OR<br>D10OR<br>NEUTRAL OR<br>PARK OR<br>REVERSE<br><br>DTCs not fault pending | = FALSE<br>= 1 Boolean<br><br>>5.00 volts<br>> 25 milliseconds<br><br>>9.00 volts<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>>1.00 seconds<br><br><br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 0 Boolean<br>= 0 Boolean<br>= 0 Boolean<br><br>Transmission Shift Lever Position Validity | fail time 1 > 1.00 seconds | Emissions Neutral Diagnostics - Type C |
| | | | switch state update fail time 2 100 millisecond update rate | = tap down (downshift) state active | service mode $04 active<br>diagnostic monitor enable<br><br>run crank voltage<br>run crank voltage time<br><br>run crank voltage<br>P1761 fault active | = FALSE<br>= 1 Boolean<br><br>>5.00 volts<br>> 25 milliseconds<br><br>>9.00 volts<br>= FALSE | fail time 2 > 120.00 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P0826 fault active<br>P0826 test fail this key on<br>P0826 fault pending<br>(P0816 fault active OR<br>P0816 fault active test fail this key on)<br>PRNDL range change time<br>PRNDL in range:<br>D1 OR<br>D2OR<br>D3OR<br>D4OR<br>D5OR<br>D6OR<br>D7OR<br>D8OR<br>D9OR<br>D10OR<br>NEUTRAL OR<br>PARK OR<br>REVERSE<br><br>DTCs not fault pending | = FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br><br>> 1.00 seconds<br><br><br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 1 Boolean<br>= 0 Boolean<br>= 0 Boolean<br>= 0 Boolean<br><br>Transmission Shift Lever Position Validity | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Up and Down Shift Switch Circuit | P0826 | Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range.<br><br>Emissions neutral default, disables tap-up tap-down or manual-up manual-down. | switch state<br>update fail time<br>100 millisecond update rate | = illegal (voltage out of range) | service mode $04 active<br>diagnostic monitor enable<br><br>run crank voltage<br><br>run crank voltage<br>P1761 fault active<br>(P0826 fault active OR<br>P0826 fault active test fail<br>this key on) | = FALSE<br>= 1 Boolean<br><br>>5.00 volts<br><br>>9.00 volts<br>= FALSE<br>= FALSE<br>= FALSE | fail time > 60.00 seconds<br><br>run crank voltage time > 25 milliseconds | Emissio ns Neutral Diagnost ics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Control Circuit Open | P0960 | Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit<br><br>Increment fail time | > 200 K Q impedance between signal and controller ground | | | fail time > 0.30 seconds out of sample time > 0.50 seconds | Type A, 1 Trips |
| | | | | | battery voltage | > 9.00 volts and<br>< 32.00 volts | >1.00 seconds | |
| | | | | | (run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode) | >5.00 volts<br><br>= TRUE<br><br>= ACCESSORY | > 25 milliseconds | |
| | | | | | diagnostic monitor enable calibration | = 1 (1 is enable, 0 is disable) | > 12.5 milliseconds | |
| | | | | | (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Control Circuit Low | P0962 | Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode))<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Control Circuit High | P0963 | Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Control Circuit Open | P0964 | Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Control Circuit Low | P0966 | Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Control Circuit High | P0967 | Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Control Circuit Open | P0968 | Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br>OR<br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br>OR<br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Control Circuit Low | P0970 | Controller specific circuit diagnoses 9 speed CB38.10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Control Circuit High | P0971 | Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Wheel Speed Sensor Sequence Number Incorrect | P15FD | This DTC monitors wheel speed signals for an incorrect sequence | Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect.<br>A complete set of sequence numbers has not been received for<br><br>and this state is continuous for<br><br>out of a total sample time of | > 10.00 seconds<br><br>>2.00 seconds<br><br>> 12.00 seconds | Sequence Number Error DTC is enabled<br><br>Power Mode<br><br>Run/Crank Ignition Voltage<br><br>Driven and non-driven wheel rotational status is currently being received and not failsoft. | Enabled<br><br>= Run or Crank<br><br>>=11.00 Volts | Diagnostic executes in 25ms loop. | Emissio ns Neutral Diagnost ics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Output Speed Sensor Circuit Forward Direction Error | P172A | The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error. | (raw TOS direction OR<br>raw TIS direction OR<br><br>intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw)<br>AND<br>attained gear AND<br>attained gear | # forward<br>± forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality =enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | Type A, 1 Trips |
| | | | (raw TOS direction OR<br><br>intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw)<br>AND<br>attained gear AND<br>attained gear | ± forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available** | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | (raw TOS direction OR<br>raw TIS direction OR<br><br>intermediate speed sensor 2 direction raw)<br>AND<br>attained gear AND<br>attained gear | # forward<br>± forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete) | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | enable time | > 1.00 seconds | | |
| | | | (raw TOS direction OR<br>raw TIS direction OR<br><br>intermediate speed<br>sensor 1 direction raw)<br>AND<br>attained gear AND<br>attained gear | ± forward<br># forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | 2.50 seconds | |
| | | | (raw TOS direction OR<br><br>intermediate speed<br>sensor 2 direction raw)<br>AND<br>attained gear AND<br>attained gear | ± forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>> | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **engine speed time for transmission hydraulic pressure available** | | |
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | | |
| | | | (raw TOS direction OR<br><br>intermediate speed sensor 1 direction raw)<br>AND<br>attained gear AND<br>attained gear | ± forward<br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | range shift state (auto trans shift complete)<br><br>enable time | = range shift complete<br><br>>1.00 seconds | | |
| | | | (raw TOS direction OR raw TIS direction) AND attained gear AND attained gear | # forward<br>± forward<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | |
| | | | raw TOS direction attained gear | # forward<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | engine speed<br>engine speed time<br><br><br><br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>(attained gear<br>AND<br>attained gear)<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | > 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>> 1st gear<br><br>< 10th gear<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Control System - Shift Limiting Active | P175E | The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor | unintended decel test system fault<br>unintended decel test system fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active<br>AND unintended deceleration latent fault fail count))<br><br>UPDATE unintended decel test system fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | = FALSE<br><br>= TRUE<br><br>= TRUE<br>= FALSE<br><br>= TRUE<br><br>= 100 counts | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>continue execute only IF:<br>calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN<br>SET unintended decel test system fault occur = TRUE | = 1 Boolean<br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br>= CeTSDD_e_WhlSpdBackUp | unintended decel test system fault time > 10.0 seconds<br>UPDATE unintended deceleration latent fault fail count<br>SET unintended decel test system fault = TRUE<br><br>unintended deceleration latent fault fail count > 100 counts<br><br>25 millisecond update rate | Type A, 1 Trips |
| | | | ECM range sensor fault<br>ECM range sensor fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE<br><br>= TRUE | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria | = 0 Boolean<br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br>= FALSE | ECM range sensor fault time > 10.0 seconds<br>UPDATE ECM range sensor latent fault fail count<br>SET ECM range sensor fault = TRUE | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | counts the run/crank ignition cycles before the latent fault DTC is set fault active. | AND ECM range sensor latent fault fail count))<br><br>UPDATE ECM range sensor fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | = 100 counts | met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>IF<br>ECM P2802 fault active<br>OR<br>ECM P2803 fault active<br>SET ECM range sensor fault occur = TRUE | = TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br>= TRUE<br><br>= TRUE | ECM range sensor latent fault fail count > 100 counts<br><br>25 millisecond update rate | |
| | | | TCM range sensor fault<br>TCM range sensor fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active<br>AND TCM range sensor latent fault fail count))<br><br>UPDATE TCM range sensor fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE<br><br>= TRUE<br><br>= 255 counts | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>IF<br>TCM P0707 fault active<br>OR<br>TCM P0708 fault active<br>SET TCM range sensor fault occur = TRUE | = 0 Boolean<br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br>= TRUE<br><br>= TRUE | TCM range sensor fault time > 409.0 seconds<br>UPDATE TCM range sensor latent fault fail count<br>SET TCM range sensor fault = TRUE<br><br>TCM range sensor latent fault fail count > 255 counts<br><br>25 millisecond update rate | |
| | | | TOSS fault<br>TOSS fault occur<br><br>RunCrankVoltageMet<br>(default gear option | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage | = 1 Boolean<br><br>> 5.00 volto | TOSS fault time > 10.0 seconds<br>UPDATE TOSS latent fault fail count | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | active<br>OR<br>(*default gear option active<br>AND TOSS sensor latent fault fail count))<br><br>UPDATE TOSS fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | <br><br>= TRUE<br><br>= 100 counts | for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>IF<br>P077C or P077D fault active OR<br>P0722 or P0723 test fail this key on<br>SET TOSS fault occur = TRUE | > 12.5 milliseconds<br><br><br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br><br><br><br><br>= TRUE<br><br>= TRUE | SET TOSS fault = TRUE<br><br>TOSS latent fault fail count > 100 counts<br><br>25 millisecond update rate | |
| | | | tie-up fault<br>tie-up fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active<br>AND tie-up latent fault fail count))<br><br>UPDATE tie-up fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE<br><br><br>= TRUE<br><br>= 100 counts | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>IF<br>P077C or P077D fault active OR<br>P0722 or P0723 test fail this key on | = 1 Boolean<br><br><br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br><br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br><br><br><br><br>= TRUE<br><br>= TRUE | tie-up fault time > 10.0 seconds<br>UPDATE tie-up latent fault fail count<br>SET tie-up fault = TRUE<br><br>tie-up latent fault fail count > 100 counts<br><br>25 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | SET tie-up fault occur = TRUE | | | |
| | | | trans range fault<br>trans range fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active<br>AND tie-up latent fault fail count))<br><br>UPDATE trans range fault time<br><br>*default gear option active occurs when emission MIL active due to transmission default gear | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE<br><br>= TRUE<br><br>= 200 counts | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE<br><br>IF<br>[(P0717 or P07C0 or P07BF fault active<br>or<br>P077D or P077C fault active or<br>P723 test fail this key on<br>or<br>P0723 or P077D or P077C or P0722 fault pending<br>or<br>P0716or P07C0 or P07BF or P0717fault pending<br>or<br>P172B orP172Aor P0721 fault pending<br>or<br>P1783 or P17CE fault active<br>or | = 1 Boolean<br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE | trans range fault time > 10.0 seconds<br>UPDATE trans range latent fault fail count<br>SET trans range fault = TRUE<br><br>trans range latent fault fail count > 200 counts<br><br>25 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P1783 or P17CE fault pending<br>or<br>P172Aor P172B test fail this key on<br>or<br>P0721 fault active)<br>AND<br>(safety diasble cal not FALSE OR<br>safety enable cal TRUE)]<br>OR<br>[(P176C orP160Eor P0963 or P078F or P0707 fault pending<br>or<br>P18AA fault active)<br>AND<br>(safety diasble cal not FALSE OR<br>safety enable cal TRUE)]<br><br>SET trans range fault occur = TRUE | = TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= 0 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= TRUE<br><br>= 0 Boolean<br><br>= 1 Boolean | | |
| | | | tie-up test disable fault<br>tie-up test disable fault occur<br><br>RunCrankVoltageMet<br>(*default gear option active<br>OR<br>(*default gear option active<br>AND tie-up test latent fault fail count))<br><br>UPDATE tie-up test latent fault time<br><br>*default gear option active | = FALSE<br>= TRUE<br><br>= TRUE<br>= FALSE<br><br>= TRUE<br><br>= 100 counts | test enable calibration<br><br>RunCrankVoltageMet = TRUE when:<br>run crank voltage<br>for run crank voltage time<br><br>vehicle speed trip criteria met when:<br>vehicle speed trip criteria met<br>RunCrankVoltageMet<br>vehicle speed<br>for vehicle speed time<br>THEN SET vehicle speed trip criteria met = TRUE | = 1 Boolean<br><br>> 5.00 volts<br>> 12.5 milliseconds<br><br>= FALSE<br><br>= TRUE<br>> 18.0 KPH<br>> 120.0 seconds | tie-up test latent fault time > 10.0 seconds<br>UPDATE tie-up test latent fault fail count<br>SET tie-up test disable fault = TRUE<br><br>tie-up test latent fault fail count > 100 counts<br><br>25 millisecond update rate | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | occurs when emission | | IF | | | |
| | | | MIL active due to | | EngineTorqueEstInaccura | = TRUE | | |
| | | | transmission default gear | | te | | | |
| | | | | | AcceleratorPedalFailure | = TRUE | | |
| | | | | | OR | | | |
| | | | | | CrankSensor_FA | = TRUE | | |
| | | | | | OR | | | |
| | | | | | P2534 fault active | = TRUE | | |
| | | | | | OR | | | |
| | | | | | (P0707 test fail this key | = TRUE | | |
| | | | | | on OR | | | |
| | | | | | P0707 fault active OR | = TRUE | | |
| | | | | | P0708 test fail this key on | = TRUE | | |
| | | | | | OR | | | |
| | | | | | P0708 fault active OR | = TRUE | | |
| | | | | | P2805 fault active OR | = TRUE | | |
| | | | | | P27EE fault active OR | = TRUE | | |
| | | | | | P27EB fault active OR | = TRUE | | |
| | | | | | P27ED fault active OR | = TRUE | | |
| | | | | | P17F7 fault active OR | = TRUE | | |
| | | | | | P17F5 fault active OR | = TRUE | | |
| | | | | | P17F6 fault active OR | = TRUE | | |
| | | | | | P17FC fault active OR | = TRUE | | |
| | | | | | P17FA fault active OR | = TRUE | | |
| | | | | | P17FB fault active) | = TRUE | | |
| | | | | | OR | | | |
| | | | | | (P0716 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P0717 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | = TRUE | | |
| | | | | | OR | = TRUE | | |
| | | | | | P0721 fault pending, fault | | | |
| | | | | | active, test fail this key on | = TRUE | | |
| | | | | | OR | | | |
| | | | | | P0722 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | = TRUE | | |
| | | | | | P0723 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | = TRUE | | |
| | | | | | P077B fault oendina, fault | = TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | active, test fail this key on | = TRUE | | |
| | | | | | OR | | | |
| | | | | | P077C fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P077D fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | = TRUE | | |
| | | | | | OR | | | |
| | | | | | P07BF fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P07C0 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P172A fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P172B fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P176B fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P176C fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P176D fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P1783 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P178F fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P17C4 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P17C5 fault pending, fault | = TRUE | | |
| | | | | | active, test fail this key on | | | |
| | | | | | OR | | | |
| | | | | | P17C6 fault oendina, fault | = TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | active, test fail this key on<br>OR<br>P17C7 fault pending, fault active, test fail this key on<br>OR<br>P17CC fault pending, fault active, test fail this key on<br>OR<br>P17CD fault pending, fault active, test fail this key on<br>OR<br>P17CE fault pending, fault active, test fail this key on<br>OR<br>P17D3 fault pending, fault active, test fail this key on<br>OR<br>P17D6 fault pending, fault active, test fail this key on)<br><br>SET tie-up test disable fault occur = TRUE | <br><br>= TRUE<br><br><br>= TRUE<br><br><br>= TRUE<br><br><br>= TRUE<br><br><br>= TRUE<br><br><br>= TRUE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance | P176B | The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational. | deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded))<br><br>update faiil time<br>25 millisecond update rate | > 10.0 RPM | diagnostic monitor enable<br><br>speed sesnor configuration calibration is single OR dual<br><br>ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE<br><br>ratio calibration is function of command gear and intermediate speed sesnor when REVERSE<br><br>**********<br><br>delay time updates when: estimated transmission intermediate speed (transmission input | = 1 Boolean<br><br>= CeTNSR_e_NSPD_Dual SpdSnsr<br><br>**P176B ratio calibration = when not REVERSE**<br>see supporting tables<br><br>**P176B ratio calibration = when REVERSE**<br>see supporting tables<br>**********<br><br>><br>**P176B minimum estimated transmission intermediate speed to enable fail evaluation** | fail time ><br>**P176B intermediate speed sensor fail time threshold**<br>see supporting tables<br><br>fail time threshold met increments fail count,<br>fail count ><br>**P176B intermediate speed sensor fail count threshold**<br>see supporting tables<br><br>**********<br><br>delay time > | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | speed / ratio calibration) with<br><br>transmission input speed<br><br>input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation)<br>with<br>with attained gear<br><br>**********<br><br>transmission input speed<br>transmission output speed<br>neutral idle mode<br>range shift state<br>P0716 fault active<br>P0717 fault active<br>P07BF fault active<br>P07C0 fault active<br>P0722 fault active<br>P0723 fault active<br>P077C fault active<br>P077D fault active<br>P176C fault active<br>P176D fault active<br>battery voltage | see supporting tables<br><br>**P176B minimum transmission input speed to enable fail > evaluation**<br>see supporting tables<br><br>**P176B holding clutch = states**<br>see supporting tables<br><br>= REVERSE<br>OR<br>= 1st thru 10th<br>**********<br><br>> 240.0 RPM<br>> 36.0 RPM<br>= nuetral idle mode ON<br>= range shift complete<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>>9.00 volts<br><br>= FALSE | **P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation**<br>see supporting tables | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | service fast learn active<br>run crank voltage<br><br>transmission hydraulic pressure available: engine speed | >9.00 volts<br><br>> 500.0 RPM | battery voltage time > 0.100 seconds<br><br>run crank voltage time > 0.100 seconds<br><br>engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Low | P176C | Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | < 0.25 volts (< 0.5 Q impedance between signal and controller ground) | service mode $04 active<br>diagnostic monitor enable<br>P176D fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>P176C fault active<br>P176C test fail this key on | = FALSE<br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= FALSE<br>= FALSE | fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High | P176D | Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | > 4.75 volts (< 0.5 Q impedance between signal and controller power) | service mode $04 active<br>diagnostic monitor enable<br>P176C fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>P176D fault active<br>P176D test fail this key on | = FALSE<br>= 1.00 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= FALSE<br>= FALSE | fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input Speed Sensor Direction Not Plausible - Forward | P1783 | The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error. | raw TIS direction AND attained gear | *t* FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | Type A, 1 Trips |
| | | | raw TIS direction AND attained gear AND attained gear | # FORWARD<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br>seconds | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | intermediate speed sensor 1 direction raw AND<br>TIS direction AND<br>attained gear | **intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br># FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete) | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | enable time | | | |
| | | | intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>± FORWARD<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>engine speed time<br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br>range shift state (auto trans shift complete)<br>enable time | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br>= range shift complete<br>>1.00 seconds | 2.50 seconds | |
| | | | intermediate speed sensor 2 direction raw AND TIS direction AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>*t* FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>CrIlyll OfJC'CzCIIIIIICr | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>> | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **engine speed time for transmission hydraulic pressure available** seconds | | |
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE | | |
| | | | | | range shift state (auto trans shift complete) | = range shift complete | | |
| | | | | | enable time | > 1.00 seconds | | |
| | | | intermediate speed sensor 2 direction raw AND<br>raw TIS direction AND<br>attained gear AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>± FORWARD<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>engine speed time | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>> **engine speed time for transmission hydraulic pressure available** seconds | 2.50 seconds | |
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br>= range shift complete | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | range shift state (auto trans shift complete)<br><br>enable time | > 1.00 seconds | | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw)<br>AND<br>TIS direction AND attained gear | **intermediate speed sensor 1 or 2**<br>*** predicted direction**<br><br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>*t* FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | 2.50 seconds | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw)<br>-AND---------- | **intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>**intermediate speed sensor 1 or 2**<br>**# predicted direction** | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>> | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | raw TIS direction AND<br>attained gear AND<br>attained gear | # FORWARD<br>> 1st gear<br>< 10th gear | engine speed<br>engine speed time<br><br><br><br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br><br>> 1.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intermediate Speed Sensor 1 Direction Not Plausible - Forward | P178F | The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error. | intermediate speed sensor 1 direction raw<br>AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available** seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | Type A, 1 Trips |
| | | | intermediate speed sensor 1 direction raw<br>AND<br>attained gear AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available** seconds | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | intermediate speed sensor 1 direction raw AND<br>TIS direction AND<br>attained gear | **intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br># FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete) | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | enable time | | | |
| | | | intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>± FORWARD<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>engine speed time<br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br>range shift state (auto trans shift complete)<br>enable time | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available** seconds<br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br>= range shift complete<br>>1.00 seconds | 2.50 seconds | |
| | | | (intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>**intermediate speed sensor 1 or 2 # predicted direction**<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>CrIlyll OfJC'CzCIIIIIICr | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>> | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **engine speed time for transmission hydraulic pressure available**<br>seconds | | |
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw) AND<br>attained gear AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>**intermediate speed sensor 1 or 2 # predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | range shift state (auto trans shift complete)<br><br>enable time | > 1.00 seconds | | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>**intermediate speed sensor 1 or 2 # predicted direction**<br><br># FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | 2.50 seconds | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw OR TIS dirootion)AND | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>**intermediate speed sensor 1 or 2 # predicted direction**<br><br>**-f FORWARD** | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>= | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | attained gear AND<br>attained gear | > 1st gear<br>< 10th gear | engine speed<br>engine speed time<br><br><br><br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br><br>> 1.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intermediate Speed Sensor 2 Performance | P17C5 | The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse. | when:<br>(intermediate speed sensor raw direction when transitional period = FALSE<br>AND<br>intermediate speed sensor raw direction when transitional period = FALSE)<br>OR<br>intermediate speed sesnor raw when transitional period = TRUE<br><br>update fail and sample time | # FORWARD<br><br>± REVERSE<br><br>**P17C5P17D3 intermediate speed > sensor RPM** | service mode $04 active<br>diagnostic monitor enable<br>intermediate speed sesnor count sample period<br>P17C5 fault active OR<br>P17C5 test fail this key on<br>senor type calibration (senor type is directional)<br><br>transitional period detected = FALSE when:<br>on period OR<br>on period when direction unknown<br>OR<br>on period<br>on period when direction is reverse<br>OR<br>on period<br>on period when direction is forward<br><br>transitional period detected = TRUE when:<br>on period<br>on period when direction unknown | = FALSE<br>= 1 Boolean<br># 0 counts<br><br>= FALSE<br>= FALSE<br>= CeTNSR_e_NSPD_Dual SpdSnsr<br><br>> 0.4434 seconds<br>< 0.2773 seconds<br><br>< 0.2363 seconds<br>> 0.1240 seconds<br><br>< 0.0811 seconds<br>> 0.0088 seconds<br><br>< 0.4434 seconds<br>> 0.2773 seconds | fail time > 3.500 seconds<br>out of sample time > 5.000 seconds<br><br>6.26 millisecond update | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intermediate Speed Sensor 2 Direction Not Plausible - Forward | P17C6 | The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error. | intermediate speed sensor 2 direction raw<br>AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available** seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | 2.50 seconds | Type A, 1 Trips |
| | | | intermediate speed sensor 2 direction raw<br>AND<br>attained gear AND<br>attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available** seconds | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | intermediate speed sensor 2 direction raw<br>AND<br>TIS direction AND<br>attained gear | **intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br># FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete) | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | enable time | > 1.00 seconds | | |
| | | | intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>± FORWARD<br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>engine speed time<br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br>range shift state (auto trans shift complete)<br>enable time | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available** seconds<br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br>= range shift complete<br>>1.00 seconds | 2.50 seconds | |
| | | | (intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br>**intermediate speed sensor 1 or 2 # predicted direction**<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br>TOSS sensor type must be directional<br>engine speed<br>engine epcce time | **speed sensor directional rationality = enable calibration**<br>= CeTOSR_e_Directional<br>> 500.0 RPM<br>> | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **engine speed time for transmission hydraulic pressure available**<br>seconds | | |
| | | | | | battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | >9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw)<br>AND<br>attained gear AND<br>attained gear | **intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>**intermediate speed sensor 1 or 2**<br>**# predicted direction**<br><br>> 1st gear<br>< 10th gear | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear | **speed sensor directional rationality**<br>**= enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | = FALSE<br><br>= range shift complete<br><br>>1.00 seconds | | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>**intermediate speed sensor 1 or 2 # predicted direction**<br><br># FORWARD<br>= REVERSE | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type must be directional<br><br>engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional<br><br>> 500.0 RPM<br>><br>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>>1.00 seconds | 2.50 seconds | |
| | | | (intermediate speed sensor 1 direction raw OR<br><br>-intermediate **speed** | **intermediate speed sensor 1 or 2 # predicted direction**<br><br>**intermediate speed sensor 1 or 2 + predicted direction** | when the following conditions are met update the enable time:<br>diagnsotic monitor enable<br><br>TOSS sensor type<br>must be directional | **speed sensor directional rationality = enable calibration**<br><br>= CeTOSR_e_Directional | 2.50 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | sensor 2 direction raw OR<br>TIS direction) AND<br>attained gear AND<br>attained gear | ± FORWARD<br>> 1st gear<br>< 10th gear | engine speed<br>engine speed time<br><br>battery voltage<br>for time<br>service fast learn active<br>run/crank voltage<br>for time<br>attained gear<br>P0721 Fault Active<br><br>range shift state (auto trans shift complete)<br><br>enable time | > 500.0 RPM<br>>**engine speed time for transmission hydraulic pressure available**<br>seconds<br><br>>9.00 volts<br>> 0.100 seconds<br>= FALSE<br>>9.00 volt<br>> 0.100 seconds<br>= REVERSE<br>= FALSE<br><br>= range shift complete<br><br>> 1.00 seconds | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Intermediate Speed Sensor B Circuit Low | P17CC | Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | < 0.250 volts (< 0.5 Q impedance between signal and controller ground) | service mode $04 active<br>diagnostic monitor enable<br>P17CD fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>sensor configuration is single OR dual<br><br>P17CC fault active<br>OR<br>P17CC test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= CeTNSR_e_NSPD_Dual SpdSnsr<br><br>= FALSE<br><br>= FALSE | fail time > 0.050 seconds, update fail count 12.5 millisecond update rate<br><br>fail count > 40 counts 12.5 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Intermediate Speed Sensor B Circuit High | P17CD | Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds. | transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate | > 4.750 volts (< 0.5 Q impedance between signal and controller power) | service mode $04 active<br>diagnostic monitor enable<br>P17CC fault active<br>service fast learn<br><br>run crank voltage<br>battery voltage<br><br>sensor configuration is single OR dual<br><br>P17CD fault active<br>OR<br>P17CD test fail this key on | = FALSE<br>= 1 Boolean<br>= FALSE<br>= FALSE<br><br>> 10.00 volts<br>> 10.00 volts<br><br>= CeTNSR_e_NSPD_Dual SpdSnsr<br><br>= FALSE<br><br>= FALSE | fail time > 0.050 seconds, update fail count 12.5 millisecond update rate<br><br>fail count > 40 counts 12.5 millisecond update rate<br><br>run crank and battery voltage time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Input Speed Sensor Direction Error | P17CE | The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse. | input shaft speed sesnor raw direction<br>when transitional period = FALSE<br>AND<br>input shaft speed sesnor raw direction<br>when transitional period = FALSE<br>OR<br>input shaft speed sesnor raw<br>when transitional period = TRUE<br><br>update fail and sample time, update rate defined in Secondary Parameters | ± FORWARD<br><br># REVERSE<br><br>> 225.0 RPM | determine update rate:<br>6.26 millisecond update rate calibration,<br>TRUE, update rate = 6.25 millisecond<br>FALSE,<br>update rate = 25 millisecond<br><br>service mode $04 active<br>diagnostic monitor enable<br>input shaft speed sesnor count sample period<br>senor type calibration<br>(senor type is directional)<br><br>P17CE fault active OR<br>P17CE test fail this key on<br><br>transitional period detected = FALSE when:<br>on period OR<br>on period<br>when direction unknown<br>OR<br>on period<br>on period<br>when direction is reverse<br>OR<br>on period<br>on period<br>when direction is forward<br><br>transitional period detected = TRUE when:<br>on period<br>on period<br>when direction unknown | = 1 Boolean<br><br>= FALSE<br>= 1 Boolean<br># 0 counts<br><br>= CeTISR_e_Directional<br><br>= FALSE<br>= FALSE<br><br>> 0.4434 seconds<br>< 0.2773 seconds<br><br>< 0.2363 seconds<br>> 0.1240 seconds<br><br>< 0.0811 seconds<br>> 0.0088 seconds<br><br>< 0.4434 seconds<br>> 0.2773 seconds | fail time > 3.500 seconds<br>out of sample time > 5.000 seconds<br><br>update rate defined in Secondary Parameters | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Intermediate Speed Sensor 1 Direction Error | P17D3 | The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse. | intermediate speed sesnor raw direction when transitional period = FALSE<br>AND<br>intermediate speed sesnor raw direction when transitional period = FALSE<br>OR<br>intermediate speed sesnor raw when transitional period = TRUE<br><br>update fail and sample time<br>6.26 millisecond update rate | ± FORWARD<br><br># REVERSE<br><br>**P17C5 P17D3 intermediate speed > sensor RPM** | service mode $04 active<br>diagnostic monitor enable<br>intermediate speed sesnor count sample period<br>P17D3 fault active OR<br>P17D3 test fail this key on<br>senor type calibration (senor type is directional)<br><br>transitional period detected = FALSE when:<br>on period OR<br>on period when direction unknown<br>OR<br>on period<br>on period when direction is reverse<br>OR<br>on period<br>on period when direction is forward<br><br>transitional period detected = TRUE when:<br>on period<br>on period when direction unknown | = FALSE<br>= 1 Boolean<br># 0 counts<br><br>= FALSE<br>= FALSE<br>= CeTNSR_e_NSPD_Dual SpdSnsr<br><br>> 0.4434 seconds<br>< 0.2773 seconds<br><br>< 0.2363 seconds<br>> 0.1240 seconds<br><br>< 0.0811 seconds<br>> 0.0088 seconds<br><br>< 0.4434 seconds<br>> 0.2773 seconds | fail time > 3.500 seconds<br>out of sample time > 5.000 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Intermediate Speed Sensor B Circuit Range/ Performance | P17D6 | The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational. | delta1 =ABS (transmission input speed - (transmission output speed * gear ratio commanded))<br>AND<br>delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration))<br><br>update faiil time<br>25 millisecond update rate | > 10.0 RPM<br><br>><br>**P17D6 intermediate speed sensor fail RPM threshold**<br>see supporting tables | diagnostic monitor enable<br><br>speed sesnor configuration calibration is dual<br><br>ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE<br><br>ratio calibration is function of command gear and intermediate speed sesnor when REVERSE<br>**********<br><br>delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration) with | = 1 Boolean<br><br>=<br>CeTNSR_e_NSPD_Dual SpdSnsr<br><br>=<br>**P17D6 ratio calibration when not REVERSE**<br>see supporting tables<br><br>=<br><br>**P17D6 ratio calibration when REVERSE**<br>see supporting tables<br>**********<br><br>><br>**P17D6 minimum estimated transmission intermediate speed to enable fail evaluation**<br>see supporting tables | fail time ><br>**P17D6 intermediate speed sensor fail time threshold**<br>see supporting tables<br><br>fail time threshold met increments fail count,<br>fail count ><br>**P17D6 intermediate speed sensor fail count threshold**<br>see supporting tables<br><br>**********<br><br>delay time > | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | transmission input speed | ><br>**P17D6 minimum transmission input speed to enable fail evaluation**<br>see supporting tables | **P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation**<br>see supporting tables | |
| | | | | | input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation)<br>with<br>with attained gear | =<br>**P17D6 holding clutch states**<br>see supporting tables<br><br>= REVERSE<br>OR<br>= 1st thru 10th | | |
| | | | | | ********** | ********** | | |
| | | | | | transmission input speed<br>transmission output speed<br>neutral idle mode<br>range shift state<br>P0716 fault active<br>P0717 fault active<br>P07BF fault active<br>P07C0 fault active<br>P0722 fault active<br>P0723 fault active<br>P077C fault active<br>P077D fault active<br>P17CC fault active<br>P17CD fault active<br>battery voltage | > 240.0 RPM<br>> 36.0 RPM<br>= nuetral idle mode ON<br>= range shift complete<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>= FALSE<br>>9.00 volts | | | |
| | | | | | service fast learn active<br>run crank voltage | = FALSE<br>>9.00 volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | transmission hydraulic pressure available: engine speed | > 500.0 RPM | battery voltage time > 0.100 seconds<br><br>run crank voltage time > 0.100 seconds<br><br>engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch A Circuit/Open | P17F5 | The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit. | raw sensor voltage<br>raw sensor voltage | > 0.41 volts<br>< 1.504 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch A Circuit Low | P17F6 | The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit. | raw sensor voltage | < 0.414 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch A Circuit High | P17F7 | The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit. | raw sensor voltage | > 2.538 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch B Circuit/Open | P17FA | The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit. | raw sensor voltage<br>raw sensor voltage | > 1.263 volts<br>< 1.504 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch B Circuit Low | P17FB | The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit. | raw sensor voltage | < 0.414 volts | diagnostic monitor enable<br>battery voltage<br>battey voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch B Circuit High | P17FC | The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit. | raw sensor voltage | > 2.538 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Stuck On (GRIOOnly) | P187D | This diagnostic monitor rationalizes the driver ETRS command direction of "out of PARK" against the actual park valve position, as the park valve position is measured by the park valve position sensor A or B. | when:<br>out of park commanded<br><br>only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park<br>OR<br>two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park<br><br>transition delay for commanded park valve transition<br>(not required for steady state commanded out of park conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | # Park<br><br>= Park<br><br>= Park<br><br>><br>**P187D P18E7 Park to Out Of Park Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park valve stuck on diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)<br>OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>(mode valve A commanded high and mode valve A confirmed high)<br>OR<br>mode valve related fault disabled confirmation (P18AA0R P18AB OR P27EC Test Fail This Key)<br>OR<br>(P27EBOR P27EDOR P27EE Fault Active)<br><br>pump out available<br>(engine speed<br>for | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= TRUE | steady state fail time > 0.25 seconds<br>OR<br>transition fail time > 0.25 seconds<br><br>fail count > 2 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | engine speed time)<br><br>line pressure available (commanded)<br><br>line pressure sufficient for pull out of park (transition) or<br>maintain out of park (steady state) | > 250 RPM<br>**Pump Out Available**<br>**> Transition Time**<br><br>> 100.00 kPa<br><br>> 1,000.00 kPa<br><br>> 500.00 kPa | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Stuck Off (GRIOOnly) | P187E | This diagnostic monitor rationalizes the driver ETRS command direction of “PARK” against the actual park valve position, as the park valve position is measured by the mode valve position sensor A and B. | when:<br>park commanded<br><br>only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating park<br>OR<br>two valid park senssors sensors (Park Sensor A AND Park Sensor B) not indicating park<br><br>transition delay for commanded park valve transition<br>OR<br>transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = Park<br><br># Park<br><br># Park<br><br>><br>**P187E P18E8 Out Of Park to Park Transition Delay**<br><br>><br>**P187E P18E8 Out Of Park to Park Min Line Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park valve stuck off diagnostic enable<br><br>(high side driver 1 or high side driver 2 is on)<br>OR<br>(<br>pump out available (engine speed<br>for<br>engine speed low time)<br>AND<br>line press available (line pressure command)<br>)<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)<br>OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>(<br>(<br>((mode valve A commanded low and mode valve A confirmed low) | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><250 RPM<br><br>> 0.25<br><br>= FALSE<br>< 100.00 kPa<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE | steady state fail time > 0.25 seconds<br>OR<br>transition fail time > 1.80 seconds<br>OR<br>transition fail time (at min line) > 1.80 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | OR<br>mode valve related fault disabled confirmation (P18AA0R P18AB OR P27EC Test Fail This Key On)<br>OR<br>mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active))<br>AND<br>((park inhibit solenoid electrically stuck on)<br>OR<br>(park inhibit solenoid electrically stuck on<br>AND<br>line pressure command))<br>)<br>OR<br><br>min line commanded (line pressure command)<br>) | = TRUE<br><br>= TRUE<br><br>= TRUE<br><br>= FALSE<br><br>= TRUE<br>>**Park Inhibit Solenoid Override Line Pressure**<br><br>< 100.00 kPa | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Command Message Performance | P189C | The diagnostic monitor detects a failure of the LIN serial communication failure between the TCM and the ECM/CHCM for Electronic Transmission Range Select (ETRS) vehicles. | LIN range command is undetected by TCM based on Rx LIN service fucntion<br><br>Range Command Secondary Updated | = FALSE<br>set to FALSE as part of normal background time updates, set to TRUE as part of normal LIN service fucntion when Rx messages are processed | diagnostic monitor calibration enable<br>service mode $04 active<br>run/crank voltage<br>run/crank voltage time | = 1 Boolean<br><br>= FALSE<br>>5.00 volts<br>> 3,000.000 seconds | initial fail time > 3.000 seconds<br><br>final fail time > 425.000 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Electronic Transmission Range Select Valve Performance - Stuck On (GR10 Only) | P18A1 | This diagnostic monitor detects the condition where the transmission is latching the drive state on a commanded drive to park shift due to the range select valve being stuck on. P18A1 is only active during pressure / solenoid controlled shifts, not min line pressure default shifts which will break drive latch regardless of the range select valve position. | when:<br>commanded mode valve high to low transition (drive to park shift)<br><br>mode valve position<br><br>park valve postion remains out of park<br><br>transition delay for solenoid commanded mode valve transition<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = LOW<br><br>= HIGH<br><br># Park<br><br>> **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general mode valve diagnostic enable<br>range select valve stuck on diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>(P27EB, P27ED, P27EE Fault Active)<br><br>drive latch possible (mode valve previously confirmed position<br>AND<br>calculated line pressure) | = CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= HIGH<br><br>> 0.00 | fail time > 0.10 seconds<br><br>fail count > 3 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Inhibit Actuator Control Circuit Low (T93GR10 Only) | P18A2 | Controller specific circuit diagnoses internal ETRS park solenoid for an ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit<br><br>Increment fail time | < 0.5 Q impedance between signal and controller ground | battery voltage<br><br>run crank voltage<br>OR<br>accessory voltage active<br><br>diagnostic monitor enable calibration<br>(1=enabled, 0=disabled)<br><br>(<br>(solenoid is mapped to high side driver 1<br>(= CeTSCR_e_HSD1)<br>AND<br>high side driver 1 on)<br><br>OR<br><br>(solenoid is mapped to high side driver 2<br>(= CeTSCR_e_HSD2)<br>AND<br>high side driver 2 on)<br>) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= 1<br><br>= CeTSCR_e_HSD1<br><br>= On<br><br>= CeTSCR_e_HSD1<br><br>= On | > 1.000 seconds<br><br>25 milliseconds<br><br>12.5 milliseconds<br><br>fail time > 0.300 seconds out of sample time > 0.500 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Inhibit Actuator Control Circuit (T93 GRWOnly) | P18A3 | Controller specific circuit diagnoses internal ETRS park solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Increment fail time | > 200 K Q impedance between signal and controller ground | battery voltage<br><br>run crank voltage<br>OR<br>accessory voltage active<br><br>diagnostic monitor enable calibration<br>(1=enabled, 0=disabled)<br><br>(<br>(solenoid is mapped to high side driver 1<br>(= CeTSCR_e_HSD1)<br>AND<br>high side driver 1 on)<br><br>OR<br><br>(solenoid is mapped to high side driver 2<br>(= CeTSCR_e_HSD2)<br>AND<br>high side driver 2 on)<br>) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= 1<br><br>= CeTSCR_e_HSD1<br><br>= On<br><br>= CeTSCR_e_HSD1<br><br>= On | > 1.000 seconds<br><br>25 milliseconds<br><br>12.5 milliseconds<br><br>fail time > 0.300 seconds out of sample time > 0.500 seconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Inhibit Actuator Control Circuit High | P18A4 | Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Increment fail time | < 0.5 Q impedance between signal and controller voltage source | battery voltage<br><br>run crank voltage<br>OR<br>accessory voltage active<br><br>diagnostic monitor enable calibration<br>(1=enabled, 0=disabled)<br><br>(<br>(solenoid is mapped to high side driver 1<br>(= CeTSCR_e_HSD1)<br>AND<br>high side driver 1 on)<br><br>OR<br><br>(solenoid is mapped to high side driver 2<br>(= CeTSCR_e_HSD2)<br>AND<br>high side driver 2 on)<br>) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= 1<br><br>= CeTSCR_e_HSD1<br><br>= On<br><br>= CeTSCR_e_HSD1<br><br>= On | > 1.000 seconds<br><br>25 milliseconds<br><br>12.5 milliseconds<br><br>fail time > 0.300 seconds out of sample time > 0.500 seconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Park Inhibit Solenoid Stuck Off (GRIOOnly) | P18A8 | This diagnostic monitor detects when the park inhibit solenoid is unable to maintain out of park/neutral as expected when out of park oil is not available | when:<br>neutral commanded<br><br>out of park oil<br><br>park inhibit solenoid commanded (only required to start fail time)<br><br>only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park<br>OR<br>two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = Neutral<br><br>= Not Available<br><br>= HIGH<br><br># Out Of Park<br><br>± Out Of Park | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park inhibit solenoid stuck off diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br>OR<br>(<br>pump out available (engine speed<br>for<br>engine speed low time)<br>AND<br>line press available (line pressure command)<br>)<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)<br>OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>(<br>((mode valve A commanded low and mode valve A confirmed low)<br>OR | = CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><250 RPM<br><br>> 0.25<br><br>= FALSE<br>< 100.00 kPa<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE | fail time >0.13 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | mode valve related fault (P18AA0R P18AB OR P27EC Test Fail This Key On)<br>OR<br>mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active))<br>)<br>park inhibit solenoid not electrically stuck off (P18A3OR P18A4 Fault Active)<br>(<br>pump out available<br>(engine speed<br>for<br>engine speed low time<br>OR<br>min line commanded<br>(line pressure command)<br>)<br>aux pump commanded on | = TRUE<br>= TRUE<br>= TRUE<br>= FALSE<br>= FALSE<br>< 250.00<br>> 0.25<br>< 100.00 kPa<br>= FALSE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only) | P18AA | This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state while being commanded low or when pressure is insufficient to hold the mode valve high. After a failure of a pressure controlled mode valve high to low transition, a min line mode valve high to low transition is used for fault isolation between P18A1 and P18AA. | when:<br>mode valve solenoid commaned state<br><br>mode valve A position sensor state<br><br>transition delay for solenoid controlled mode valve transition<br><br>OR<br>transition delay for solenoid min line mode valve transition<br>(no transistion delay required for steady state commanded mode valve low conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = LOW<br><br>= HIGH<br><br>><br>**P18A1 P18AAP27EC Mode Valve High To Low Transition Delay**<br><br>><br>**P18AA Mode Valve High To Low Min Line Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general mode valve diagnostic enable<br>mode valve stuck on diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br>(<br>pump out available (engine speed for engine speed low time)<br>AND<br>line press available (line pressure command)<br>)<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br><br>AND<br><br>(<br>(<br>pump out available (engine speed for engine speed high time)<br>AND<br>line pressure available (pressure commanded) | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><250 RPM<br><br>> 0.25<br><br>= FALSE<br>< 100.00 kPa<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br>> 250.00<br>**Pump Out Available > Transition Time** | steady state fail time > 0.25 seconds<br>OR<br>high to low transition fail time >0.10 seconds<br>OR<br>high to low min line transition fail time >1.00 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>out of park status<br>)<br>OR<br>(<br>pump out available<br>OR<br>line pressure available<br>) | = TRUE<br>> 100.00 kPa<br><br># Park<br><br><br><br>= FALSE<br><br>= FALSE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit Stuck Off (GR10 Only) | P18AB | This diagnostic monitor detects a Mode Valve A Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “on” or “high” state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve A Position Sensor State changes correctly with mode valve state command. | when:<br>mode valve solenoid commaned state<br><br>mode valve A position sensor state<br><br>transition delay for solenoid controlled mode valve transition (no transistion delay required for steady state commanded mode valve high conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = HIGH<br><br>= LOW<br><br>><br>**P18AB P27EC Mode Valve Low to High Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general mode valve diagnostic enable<br>mode valve stuck off diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br><br>pump out available (engine speed<br>for<br>engine speed high time)<br>AND<br>line pressure available (pressure commanded)<br>AND<br>out of park status | = CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1.00 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br>> 250.00<br>**Pump Out Available**<br>**> Transition Time**<br><br>= TRUE<br>> 100.00 kPa<br><br>= Park | steady state fail time > 0.75 seconds<br>OR<br>low to high transition fail time 0.25 >seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control Enable Valve Stuck On (GRIOOnly) | P18AE | This diagnostic monitor detects when the Enable Valve is not able to cut pressure from the pump to the rest of the hydraulic system within the transmission. The test checks for C2 incorrectly gaining capacity when commanded on with line pressure cut. | park commanded<br><br>commanded gear<br><br>only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor indicating park<br><br>OR<br><br>two valid park sensors (Park Sensor A AND Park Sensor B) with both sensors indicating park<br><br>enable valve delay time<br><br>02 pressure command<br><br>02 slip<br><br>increment enable valve stuck on fail time | = PARK<br><br>= PARK w/ No clutches<br><br>= Park<br><br>= Park<br><br>><br>**P18AE Enable Valve Test Delay**<br><br>= 2,200.00<br><br>< 60.00 | ETRS system type is internal ETRS<br><br>high side driver 1 or high side driver 2 is on<br><br>trans oil temp<br><br>engine crank (only required to initiate test)<br><br>engine off<br><br>commanded line pressure<br><br>pump out available (engine speed for engine speed high time)<br><br>transmission input speed<br><br>enable valve diagnostic not completed (P18AE Test Pass / Test Fail This Key)<br><br>no C2 solenoid electrical (P0964 0R P0966 0R P0967 Fault Active)<br><br>no line pressure electrical fault (P2812 OR P2814 OR P2815 Fault Active)<br><br>engine crank time<br><br>total test time | =<br>CeTRGR_e_InternalETRS<br><br>= TRUE<br><br>> 0.00 Deg C<br><br>= TRUE<br><br>= FALSE<br><br>= 0<br><br>= TRUE<br>> 250.00 RPM<br>**Pump Out Available > Transition Time**<br><br>> 300.00 RPM<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br><br>**P18AE Max Crank Time** | fail time > 4.50<br><br>update rate 6.25 milleseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | < 6.00 seconds | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch "A" Performance (GR10 Only) | P18E7 | This diagnostic monitor detects park valve position sensor A performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded. | when:<br>out of park commanded<br><br>Park Sensor A indicating park<br><br>Park Sensor B not indicating park<br><br>transition delay for commanded park valve transition<br>(not required for steady state commanded out of park conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | # Park<br><br>= Park<br><br># Park<br><br>><br>**P187D P18E7 Park to Out Of Park Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park position sensor A performance diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)<br>OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>mode valve A commanded high and mode valve A confirmed high<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br><br>pump out available (engine speed | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE | steady state fail time > 0.25 seconds<br><br>transition fail time > 0.25 seconds<br><br>fail count > 1.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | for<br>engine speed time)<br><br>line pressure available (commanded)<br><br>line pressure sufficient for pull out of park | = TRUE<br>> 250 RPM<br>**Pump Out Available**<br>**> Transition Time**<br><br>> 100.00 kPa<br><br>> 1,000.00 kPa | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Park Valve Position Sensor/ Switch "B" Performance (GRWOnly) | P18E8 | This diagnostic monitor detects park valve position sensor B performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded. | when:<br><br>steady state out of park commanded<br><br>Park Sensor A not indicating park<br><br>Park Sensor B indicating park<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | # Park<br><br># Park<br><br>= Park | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park position sensor B performance diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)<br>OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>mode valve A commanded high and mode valve A confirmed high<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br><br>pump out available (engine speed<br>for | = CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE | fail time > 0.25 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | engine speed time)<br><br>line pressure available (commanded)<br><br>line pressure sufficient for pull out of park | > 250 RPM<br>**Pump Out Available**<br>**> Transition Time**<br><br>> 100.00 kPa<br><br>> 1,000.00 kPa | | |
| | | | when:<br>park commanded<br><br>Park Sensor A indicating park<br><br>Park Sensor B not indicating park<br><br>transition delay for commanded park valve transition<br>OR<br>transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = Park<br><br>= Park<br><br>5*Park<br><br>><br>**P187E P18E8 Out Of Park to Park Transition Delay**<br><br>><br>**P187E P18E8 Out Of Park to Park Min Line Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general park servo diagnostic enable<br>park position sensor B performance diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br>OR<br>(<br>pump out available (engine speed<br>for<br>engine speed low time)<br>AND<br>line press available (line pressure command)<br>)<br><br>P187D, P187E (Park Servo DTC) Test Fail This Key On<br><br>(P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><250 RPM<br><br>> 0.25<br><br>= FALSE<br>< 100.00 kPa<br><br>= FALSE | steady state fail time > 0.25 seconds<br>OR<br>transition fail time > 1.80 seconds<br>OR<br>transition fail time (at min line) > 1.80 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | OR<br>(P17FA, P17FB, P17FC (Park Sensor B) Fault Active)<br><br>mode valve A commanded low and mode valve A confirmed low (park commanded)<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) | = FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Switch Run/ Start Position Circuit Low | P2534 | Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the TCM run/ crank is active. | Ignition switch Run/Start position circuit low | Run / Crank = FALSE | Ignition switch Run/Start position circuit low diag enable<br><br>and<br><br>Run / Crank active ECM | = 1.00<br><br><br><br><br><br>= TRUE | 99 failures out of 240 samples<br><br>25 ms / sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Ignition Switch Run/ Start Position Circuit High | P2535 | Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the TCM run/ crank is NOT active. | Ignition switch Run/Start position circuit high | Run / Crank = TRUE | Ignition switch Run/Start position circuit low diag enable<br><br>and<br><br>Run / Crank active ECM | = 1.00<br><br><br><br><br><br>= FALSE | 320 failures out of 400 samples<br><br>25 ms / sample | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Actuator Supply Voltage B Circuit Low | P2670 | Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.<br><br>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit. | < 0.5 Q impedance between signal and controller ground<br>OR<br>> 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count | (ground short diagnostic monitor enable calibration<br>OR<br>open circuit diagnostic monitor enable calibration)<br><br>high side drive 2 ON<br>service mode $04 active | = 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br>= FALSE | ground short fail count > 6 counts within sample count of 2,400 counts<br>OR<br>open circuit fail count > 30 counts within sample count of 50 counts<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Stuck Off (GR10) | P2714 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C4 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use battery voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE OR | = 1 Boolean | | |
| | | | | | (use run crank voltage calibration is TRUE AND | = 1 Boolean | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br>**********<br><br>enable C4 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator pedal position<br>OR | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R) clutch pressure control solenoid. | | | engine speed<br>OR<br>transmission input shaft speed)<br><br>C4 clutch slip speed valid<br><br>C4 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C4 clutch pressure has reached fully applied state<br><br>= 1 (1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0 (1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Stuck On | P2715 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | shift type is power down shift:<br>C4 clutch slip speed<br>OR<br>shift type is garage shift:<br>C4 clutch slip speed<br>ELSE<br>shift is another type:<br>C4 clutch slip speed<br><br>update fail time<br>6.25 milliscond update | <br><br>< 50.00 RPM<br><br><br>< 100.00 RPM<br><br><br>< 50.00 RPM | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.25<br><br>shift type is another type:<br>fail time >0.15 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C4 C4, GR10C4 C23467810R, or 8 Speed C4 C23468 clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C4 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C4 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350 kPa | all delay times<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C4 exhaust delay closed throttle lift foot up shift**<br><br>open throttle upshift:<br>**C4 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,192 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C1 Torque-Based Pressure Clip**<br>OR<br>**C2 Torque-Based Pressure Clip**<br>OR<br>**C3 Torque-Based Pressure Clip**<br>OR<br>**C5 Torque-Based Pressure Clip**<br>OR<br>**C6 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift tvoes: | **C4 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C4 exhaust delay closed throttle down shift**<br><br>negative torque upshift:<br>**C4 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C4 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br>**C1 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C2 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | garage shifts:<br>**Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C1 Clutch Clip Press CD Shifts**<br>**C2 Clutch Clip Press CD Shifts**<br>**C3 Clutch Clip Press CD Shifts**<br>**C5 Clutch Clip Press CD Shifts**<br>**C6 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **C3 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C5 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C6 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift type enable cal for aaraae shift | = TRUE<br><br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable, 1 will enable) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | = NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3P17C5 P0721<br>P172AP172B P0716<br>P0717 P07C0 P07BF | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 | | |
| | | | | | ********** | P172AP172B******* ******* ********** | | |
| | | | | | NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD durino an | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | automatic transmission shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.<br>OR | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | The automatic transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control ___ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Control Circuit Open | P2718 | Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Control Circuit Low | P2720 | Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Control Circuit High | P2721 | Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Stuck Off (GR10) | P2723 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C5 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use battery voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use run crank voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br><br>**********<br><br>enable C5 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator Dedal position | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br><br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control solenoid. | | | OR<br>engine speed<br>OR<br>transmission input shaft speed)<br><br>C5 clutch slip speed valid<br><br>C5 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C5 clutch pressure has reached fully applied state<br><br>= 1 (1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0 (1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Stuck On | P2724 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | shift type is power down shift:<br>C5 clutch slip speed<br>OR<br>shift type is garage shift:<br>C5 clutch slip speed<br>ELSE<br>shift is another type:<br>C5 clutch slip speed<br><br>update fail time<br>6.25 milliscond update | < 50.00 RPM<br><br>< 100.00 RPM<br><br>< 50.00 RPM | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.25<br><br>shift type is another type:<br>fail time >0.15 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, GR10C5 C1356789, or 8 Speed C5 C45678R clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C5 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C5 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350 kPa | all time delays<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C5 exhaust delay closed throttle lift foot up shift**<br><br>open throttle upshift:<br>**C5 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,192 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C1 Torque-Based Pressure Clip**<br>OR<br>**C2 Torque-Based Pressure Clip**<br>OR<br>**C3 Torque-Based Pressure Clip**<br>OR<br>**C4 Torque-Based Pressure Clip**<br>OR<br>**C6 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift types:<br>aaraae shifts: | **C5 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C5 exhaust delay closed throttle down shift**<br><br>negative torque upshift:<br>**C5 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C5 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br>**C1 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C2 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C1 Clutch Clip Press CD Shifts**<br>**C2 Clutch Clip Press CD Shifts**<br>**C3 Clutch Clip Press CD Shifts**<br>**C4 Clutch Clip Press CD Shifts**<br>**C6 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **C3 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C4 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C6 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift type enable cal for aaraae shift | = TRUE<br><br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable, 1 will enable) | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | AND<br>Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | = NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br><br>= FALSE<br><br>= FALSE<br><br><br><br>= TRUE<br><br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3P17C5 P0721<br>P172AP172B P0716<br>P0717 P07C0 P07BF | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 | | |
| | | | | | ********** | P172AP172B******* ******* ********** | | |
| | | | | | NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD durino an | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | automatic transmission shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.<br>OR | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | The automatic transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control ___ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Control Circuit Open | P2727 | Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch solenoid, or CVTTCC Control solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br>OR<br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br>OR<br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Control Circuit Low | P2729 | Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Control Circuit High | P2730 | Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Stuck Off (GR10) | P2732 | Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line | C6 clutch slip speed, update fail time 6.25 milliscond update | > 200.0 RPM | ********** | ********** | fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use battery voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use run crank voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control | | | procedure active<br><br>hydraulic pressure available<br><br>(hydraulic pressure<br>OR<br>Clutch Stuck on in Park/ Neutral fault pending<br>OR<br>Neutral Staging Line Pressure Disable)<br>**********<br><br>enable C6 clutch slip speed fail compare when:<br><br>((startle mitigation active<br>OR<br>(startle mitigation active<br>AND<br>startle mitigation gear))<br>(see startle mitigation active NOTE below)<br><br>unintended deceleration fault pending<br>OR<br>unintended deceleration fault pending enable cal is FALSE<br>(startle mitigation)<br><br>clutch steady state adaptive active<br><br>(transmission output shaft speed<br>OR<br>accelerator pedal position<br>OR | = FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br><br>= TRUE<br><br>= TRUE<br>**********<br><br>= FALSE<br><br>= TRUE<br><br># initial startle mitigation gear<br><br>= FALSE<br><br>= 0 (0 to enable, 1 to disable)<br><br>= FALSE<br><br>> 36.0 RPM<br><br>> 0.50 % | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 GR10 C4567891ORclutch pressure control solenoid. | | | engine speed<br>OR<br>transmission input shaft speed)<br><br>C6 clutch slip speed valid<br><br>C6 clutch pressured map<br><br>(enable forward gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br>OR<br>(enable reverse gear cal<br>AND<br>driver direction request<br>AND<br>Attained Gear)<br><br>range shift state<br>**********<br><br>DTCs not fault pending<br><br>DTCs not fault active | > 1,000.0 RPM<br><br>> 350.0 RPM<br><br>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)<br><br>= mapped to line pressure, C6 clutch pressure has reached fully applied state<br><br>= 1(1 to enable, 0 to disable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 0(1 to enable, 0 to disable)<br>= REVERSE<br><br>= REVERSE<br><br>= range shift complete<br>**********<br><br>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6<br><br>P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C | > 0.500 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on<br><br>NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821 | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Stuck On (GF9 and GR10) | P2733 | Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring | common logic between P2731 and P2733<br>shift type is power down shift:<br>C6 clutch slip speed<br>OR<br>shift type is garage shift:<br>06 clutch slip speed<br>ELSE<br>shift is another type:<br>06 clutch slip speed<br><br>P2733 specific<br>attained gear<br><br>update fail time<br>6.25 milliscond update | <br><br><br>< 50.00 RPM<br><br>< 100.00 RPM<br><br>< 50.00 RPM<br><br>± 1st lock AND 1st free wheel | | | Base fail time:<br><br>shift type is power down shift:<br>fail time > 0.60 seconds<br><br>shift type is garage shift:<br>fail time > 0.25<br><br>shift type is another type:<br>fail time >0.15 seconds<br><br>Add fail time offset according to shift type:<br><br>open throttle upshift:<br>**Clutch Stuck On Fail Offset Time PU Shifts**<br><br>open throttle downshift:<br>**Clutch Stuck On Fail Offset Time PD Shifts**<br><br>garage shift:<br>**Clutch Stuck On Fail Offset Time GS Shifts**<br><br>closed throttle downshift: | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test | | | ********** | ********** | **Clutch Stuck On Fail Offset Time CD Shifts**<br><br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br><br>clutch staging shift:<br>**Clutch Stuck On Fail Offset Time STGR Shifts**<br><br>update fail count, fail count > 3 counts<br>6.25 milliscond update | |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br>OR<br>(use battery voltage calibration is TRUE<br>AND<br>battery voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage) | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts | run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | is disabled. This diagnostic monitor is relative to the GF9 C6 C6789 or GR10 C6 C4567891 OR clutch pressure control solenoid. | | | TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled<br><br>service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br>**********<br><br>range shift state<br><br>diagnostic clutch test<br><br>transmission output shaft speed<br><br>((C6 off going clutch pressure control ramp time out complete<br>AND<br>off going clutch pressure ramp control ramp time out enable)<br><br>OR<br><br>C6 off going clutch command pressure ) | = TRUE Boolean<br><br>= TRUE Boolean<br><br>= FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br>**********<br><br># range shift complete<br><br>= OFF GOING CLUTCH TEST<br><br>> 36.0 RPM<br><br>= TRUE<br><br>= 1 ( 1 to enable, 0 to disable)<br><br>< 350 kPa | all time delays<br><br>exhaust delay by shift type:<br><br>closed throttle upshift:<br>**C6 exhaust delay closed throttle lift foot up shift**<br><br>open throttle upshift:<br>**C6 exhaust delay open throttle power on up shift**<br><br>garage shifts: | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine torque<br>AND<br>Primary oncoming stuck on torque enable cal)<br><br>OR<br><br>( primary oncoming clutch active<br><br>primary on coming control state<br><br>primary on coming commanded pressure) | > 8,192 Nm<br><br>= 0 (0 is enable, 1 is enable)<br><br>= TRUE<br><br># clutch fill phase<br><br>> pressure clip threshold according to shift type:<br><br>closed and open throttle upshifts:<br><br>pressure clip threshold is dependent on the oncoming clutch:<br><br>**C1 Torque-Based Pressure Clip**<br>OR<br>**C2 Torque-Based Pressure Clip**<br>OR<br>**C3 Torque-Based Pressure Clip**<br>OR<br>**C4 Torque-Based Pressure Clip**<br>OR<br>**C5 Torque-Based Pressure Clip**<br><br>clip thresholds for all other shift types:<br>aaraae shifts: | **C6 exhaust delay garage shift**<br><br>closed throttle downshift:<br>**C6 exhaust delay garage shift**<br><br>negative torque upshift:<br>**C6 exhaust delay negative torque up shift**<br><br>open throttle downshift:<br>**C6 exhaust delay open throttle power down shift**<br><br>Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:<br>**C1 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C2 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C3 Oncoming Post-Torque Phase Delay +** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **Clutch Clip Press GS Shifts**<br>closed throttle downshift:<br>**C1 Clutch Clip Press CD Shifts**<br>**C2 Clutch Clip Press CD Shifts**<br>**C3 Clutch Clip Press CD Shifts**<br>**C4 Clutch Clip Press CD Shifts**<br>**C5 Clutch Clip Press CD Shifts**<br>negative torque upshift:<br>**Clutch Clip Press NU Shifts**<br>open throttle downshift:<br>**Clutch Clip Press PD Shifts** | **wheel slip delay**<br>OR<br>**C4 Oncoming Post-Torque Phase Delay + wheel slip delay**<br>OR<br>**C5 Oncoming Post-Torque Phase Delay + wheel slip delay** | |
| | | | | | C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation<br>**********<br><br>conditions needed to trigger test:<br><br>(current shift type<br>AND<br>shift type enable cal for current shift type)<br><br>OR<br><br>(Intrusive shift active<br>AND<br>shift tvoe enable cal for | = TRUE<br>**********<br><br># Garage shift<br><br>**Clutch Stuck On Shift = Type Enable**<br>(0 table value will disable, 1 will enable)<br><br>= FALSE<br><br>= 1 (0 will enable. 1 will | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | garage shift<br>AND<br>Attained Gear<br>AND<br>(stuck on enable cal for<br>forward garge shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear)<br>OR<br>(stuck on enable cal for<br>reverse garage shifts<br>AND<br>driver requested direction<br>AND<br>commanded gear))<br><br>clutch stuck off intrusive<br>shift active<br><br>startle mitigation active<br>(see note on startle<br>mitigation below)<br><br>(new clutch controller has<br>been initalized<br>OR<br>transitioning to a different<br>clutch controller)<br><br>current clutch solenoid<br>test state<br><br>**********<br><br>DTCs not fault pending | enable)<br><br>= NEUTRAL OR<br>commanded gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= FORWARD<br><br>= a FORWARD gear<br><br>= 1 (0 to disable, 1 to<br>enable)<br>= REVERSE<br><br>= REVERSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br><br>= TRUE<br><br>transitions to TestState or<br>TUT_HOLD (see note<br>below about state<br>transitions)<br><br>**********<br><br>P17CE P1783 P178F<br>P17C6 P17C4 P17C7<br>P17D3 P17C5 P0721<br>P172AP172B P0716 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not fault active | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not test fail this key on | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B ********** ********** | | |
| | | | | | ********** NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | HOLD during an automatic transmission shift due to two conditions:<br>Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing.<br>AND<br>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.<br>Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until:<br>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | OR<br>The automatic transmission shift completes, range shift state = range shift complete.<br><br>NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821. | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Control Circuit Open | P2736 | Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br>OR<br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br>OR<br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Control Circuit Low | P2738 | Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891ORclutch, 8 speed line pressure control, or CVT binary pump, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.10 seconds out of sample time > 0.17 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Control Circuit High | P2739 | Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891ORclutch, 8 speed line pressure control, or CVT binary pump, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Auxiliary Transmissio n Fluid Pump Control Circuit Open | P2796 | Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit<br><br>update fail and sample count | > 200 K Q impedance between signal and controller ground | diagnostic report enable<br>diagnostic monitor enable<br><br>run crank voltage<br>battery voltage<br>battery voltage<br><br>(pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)<br><br>OR<br><br>pump is not fed by any HSD | = 1 Boolean<br>= 1 Boolean<br><br>> 5.00 volts<br>> 9.00 volts<br>< 15.0 volts<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable) | > 20 fail counts out of<br>> 25 sample counts<br>update rate 100 milliseconds<br><br>> 25 milliseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Auxiliary Transmission Fluid Pump Performance | P2797 | Detects when the transmission auxiliary pump system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator or transmission auxiliary pump system. | Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count | **P2797 predicted > turbine speed error** Refer to "Transmission Supporting Tables" for details | diagnosic enable cal<br><br>PRNDL state defaulted<br><br>Transmission shift lever position<br><br>Propulsion system active<br><br>Ignition voltage<br>Ignition voltage<br><br>Transmission fluid temp<br>Transmission fluid temp | = 1 (1 to enable, 0 to disable)<br>= False<br><br>= Forward range A<br><br>= True<br><br>> 9.00 volts<br>< 31.99 volts<br><br>> 0.00 °C<br>< 110.00 °C | > 8 counts (initial fail count) Frequency =12.5ms<br><br>Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event<br><br>> 3 counts (final fail counter)<br><br>If above counter is greater than threshold then report DTC failed.<br><br>Frequency = 12.5ms<br><br>propulsion system active for > 5.00 sec | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | engine state<br>AutoStop duration min<br><br>During autostop Engine speed was<br>**********<br><br>If above conditions are met then the following must occur:<br><br>Turbine speed<br><br>Engine speed<br><br>Hydraulic pressure delay time<br><br>If above conditions are met then increment time-out timer.<br>Time-out timer<br><br>Note: The initial fail counter must achieve the fail threshold in less than the time-out time.<br>**********<br><br>If vehicle is launched then:<br><br>Transmission gear ratio | = Engine off<br>> 1.200 seconds<br><br>< 5.0 RPM<br><br>> 80.0 RPM<br><br>> 450.0 RPM<br><br>**P2797 hydraulic > pressure delay**<br>Refer to "Transmission Supporting Tables" for details<br><br><0.38 seconds<br><br>= 4.696 1st gear ratio<br>= 2.985 2nd gear ratio<br>= 2.146 3rd gear ratio<br>= 1.769 4th gear ratio<br>= 1.520 5th gear ratio<br>= 1.275 6th ciear ratio | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Trans 1st gear ratio | < 1.120 % of 1st gear ratio | | |
| | | | | | Trans 1st gear ratio | > 0.880 % of 1st gear ratio | | |
| | | | | | Trans gear ratio not 1st gear | < 1.070 % of gear ratio | | |
| | | | | | Trans gear ratio not 1st gear | > 0.930 % of gear ratio | | |
| | | | | | Valid transmission gear ratio achieved time | > 0.500 seconds | | |
| | | | | | OR | | | |
| | | | | | If vehicle is not launched but autostart occurs then: | | | |
| | | | | | Turbine speed | < 5.00 RPM | | |
| | | | | | Turbine speed less then above threshold for | > 0.500 seconds | | |
| | | | | | Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed___ | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | will return to near zero rpm.********** ****** | CrankSensor_FA | | |
| | | | | | DTCs not fault active | Transmission Output Shaft Angular Velocity Validity<br><br>Transmission Turbine Angular Velocity Validity<br><br>Transmission Oil Temperature FA<br><br>P171A, P171B, P171C, 110101,P182E, P1915<br><br>P2796, P2798, P2799 | | |
| | | | | | DTCs not Test Failed This Key On | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Auxiliary Transmissio n Fluid Pump Control Circuit Low | P2798 | Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short<br><br>update fail and sample count | < 0.5 Q impedance between signal and controller ground | diagnostic report enable<br>diagnostic monitor enable<br><br>run crank voltage<br>battery voltage<br>battery voltage<br><br>(pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)<br><br>OR<br><br>pump is not fed by any HSD | = 1 Boolean<br>= 1 Boolean<br><br>>5.00 volts<br>> 9.00 volts<br>< 15.0 volts<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable) | > 20 fail counts out of<br>> 25 sample counts<br>update rate 100 milliseconds<br><br>> 25 milliseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Auxiliary Transmissio n Fluid Pump Control Circuit High | P2799 | Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a voltage short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a voltage short<br><br>Increment fail and sample count | < 0.5 Q impedance between signal and controller voltage source | diagnostic report enable<br>diagnostic monitor enable<br><br>run crank voltage<br>battery voltage<br>battery voltage<br><br>(pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)<br><br>OR<br><br>pump is not fed by any HSD | = 1 Boolean<br>= 1 Boolean<br><br>>5.00 volts<br>> 9.00 volts<br>< 15.0 volts<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable) | > 20 fail counts out of<br>> 25 sample counts<br>update rate 100 milliseconds<br><br>> 25 milliseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid A Calibration Incorrect | P27A7 | The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid B Calibration Incorrect | P27A8 | The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC or GR10C2 C128910R clutch or CVT primary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid C Calibration Incorrect | P27A9 | The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid D Calibration Incorrect | P27AA | The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5C1356789 clutch pressure or CVT C1 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid E Calibration Incorrect | P27AB | The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C2346781OR clutch or CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid F Calibration Incorrect | P27AC | The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid G Calibration Incorrect | P27AD | The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid H Calibration Incorrect | P27AE | The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly. | pressure control solenoid characterization data programming complete<br><br>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.<br><br>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:<br><br>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed.<br>OR<br>Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data<br>OR<br>Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming.<br>OR<br>Axis data fault - pressure | = FALSE | Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle.<br><br>When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed. | | execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values. | | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit/Open | P27EB | The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit. | raw sensor voltage<br>raw sensor voltage | > 1.263 volts<br>< 1.504 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only) | P27EC | Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur. | when:<br>mode valve solenoid commaned state<br><br>mode valve A position sensor state<br><br>confirmed park servo position<br><br>transition delay for solenoid controlled mode valve transition (not required for steady state mode valve low conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = LOW<br><br>= HIGH<br><br>= PARK<br><br>><br>**P18A1 P18AAP27EC Mode Valve High To Low Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general mode valve diagnostic enable<br>mode valve sensor performance enable<br><br>high side driver 1 or high side driver 2 is on<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>move valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br>AND<br>park servo fault (P187D, P187ETest Fail This Key On)<br><br>one good park sensor<br>(V<br>P17F5, P17F6, P17F7 (Park Sensor A) Fault Active<br>OR<br>P17FA, P17FB, P17FC (Park Sensor B) Fault Active<br>)<br><br>pump out available (engine speed<br>for<br>engine speed high time)<br>AND<br>line pressure available | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br>> 250.00<br>**Pump Out Available > Transition Time** | steady state fail time> 0.02 seconds<br>OR<br>transition fail time > 0.10 seconds<br><br>fail count > 4.00 counts<br><br>update rate 6.25 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (pressure commanded) | = TRUE<br>> 100.00 kPa | | |
| | | | when:<br>mode valve solenoid commaned state<br><br>mode valve A position sensor state<br><br>confirmed park servo position<br><br>transition delay for solenoid controlled mode valve transition (not required for steady state mode valve high conditions)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = HIGH<br><br>= LOW<br><br>= OUT OF PARK<br><br>><br>**P18AB P27EC Mode Valve Low to High Transition Delay** | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br>general mode valve diagnostic enable<br>mode valve sensor performance enable<br><br>high side driver 1 or high side driver 2 is on<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>move valve sensor fault (P27EB, P27ED, P27EE Fault Active)<br>AND<br>park servo fault (P187D, P187ETest Fail This Key On )<br><br>one good park sensor<br>(<br>P17F5, P17F6, P17F7 (Park Sensor A) Fault Active<br>OR<br>P17FA, P17FB, P17FC (Park Sensor B) Fault Active<br>)<br><br>pump out available | = CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE<br><br>= FALSE | steady state fail time > 0.75 seconds<br><br>transition fail time > 0.25 seconds<br><br>fail count > 4.00 counts<br><br>update rate 6.25 milliseconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | (engine speed<br>for<br>engine speed high time)<br>AND<br>line pressure available<br>(pressure commanded) | = TRUE<br>> 250.00<br>**Pump Out Available**<br>**> Transition Time**<br><br>= TRUE<br>> 100.00 kPa | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit Low | P27ED | The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit. | raw sensor voltage | < 0.414 volts | diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Transmission Range Control A Position Sensor/ Switch Circuit High | P27EE | The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit. | raw sensor voltage | > 2.538 volts | diagnostic monitor enable<br>battery voltage<br>battery voltage time<br>ETRS system configuration is internal ERTS | = 1 Boolean<br>>9.00 volts<br>> 1.00 seconds<br>= CeTRGR_e_InternalETRS | 0.100 seconds in 0.163 second sample<br><br>6.25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid G Control Circuit Open | P2812 | Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.60 seconds out of sample time > 0.65 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid G Control Circuit Low | P2814 | Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid G Control Circuit High | P2815 | Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid H Performance /Stuck Off - GR10 Specific | P2817 | The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a “lock” mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an “on” mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the “lock” mode slip speed is excessive, or, when the ‘on” mode slip speed error is excessive. | if use TCC slip speed error OR<br>TCC control mode<br><br>TCC slip speed error = TCC slip speed - TCC command slip speed<br><br>else if<br>TCC control mode<br>torque convert slip = engine speed - transmission input shaft speed<br><br>then<br>update fail time<br>25 millisecond update rate | = 0 Boolean<br><br>= ON mode (controlled slip mode)<br>><br>**P2817TCC stuck off fail TCC slip speed**<br><br>= LOCK<br>> 130.0 RPM | diagnostic monitor enable<br><br>TCC command capacity<br><br>TCC command pressure<br><br>(TCC control mode previous<br>TCC control mode previous<br>TCC control mode previous)<br>AND<br>(TCC control mode current OR<br>TCC control mode current)<br><br>(TCC stuck off enable<br>OR<br>TCC stuck on enable)<br>hydraulic pressure available:<br>engine speed | = 1 Boolean<br><br>> 0.00 %<br><br>> 500.0 kPa<br><br># TCC control mode current<br># ON mode (controlled slip mode)<br># LOCK<br><br>= ON mode (controlled slip mode)<br>= LOCK<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>> 500.0 RPM | fail time > 4.000 seconds<br>increment fail count<br>fail count > 3 counts<br>25 millisecond update rate<br><br>TCC command capacity time > 0.00 seconds<br><br>TCC command pressure time > 2.00 seconds<br><br>engine speed time > **engine speed time for transmission hydraulic pressure available** | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | see supporting table | |
| | | | | | service fast learn active | = FALSE | | |
| | | | | | battery voltage | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | run crank voltage | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | (PTO active | = FALSE | | |
| | | | | | OR | = 1 Boolean | | |
| | | | | | PTO disable calibration) | > 8.0 % | | |
| | | | | | accelerator pedal position | < 99.0 % | | |
| | | | | | accelerator pedal position | = range shift complete | | |
| | | | | | range shift state | > -6.66 °C | | |
| | | | | | transmission fluid temperature | < 130.0 °C | | |
| | | | | | transmission fluid temperature | > 50.0 Nm | | |
| | | | | | engine torque | < 8,191.8 Nm | | |
| | | | | | engine torque | = FALSE | | |
| | | | | | P2817 test fail this key on | = ON mode (controlled slip mode) | | |
| | | | | | (TOO control mode | = LOCK | | |
| | | | | | OR | | | |
| | | | | | TCC control mode) | > | | |
| | | | | | attained gear | CeCGSR_e_CR_Second | | |
| | | | | | attainded gear slip | > 75.00 RPM | | |
| | | | | | DTCs not fault active | AcceleratorPedalFailure EngineTorqueEstlnaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D | | |
| | | | | | DTCs not fault oendina | P0722, P0723, P0716, P0717, P07BF, P07C0 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid H Stuck On - GR10 specific | P2818 | The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. This is evaluated by monitoring slip across the torque converter in two cases: 1) during low speed shifts into drive and reverse while monitoring engine speed and 2) outside of garage shifts by monitoring engine speed decel and torque for potential engine stall | ABS(TCC slip speed)<br>(set point engine speed - actual engine speed)<br><br>(maximum engine speed during garage shift - current engine speed)<br><br>engine torque<br><br>update TCC stuck on fail time garage shift | < 35.0 RPM<br><br>> 50.0 RPM<br><br>> 50.0 RPM<br><br>> 30.0 Nm | MIN(commanded or attained gear turbine speed)<br><br>active clutch control<br>freewheel-to-lock shift<br>lock-to-freewheel shift<br><br>(commanded gear<br>AND<br>output speed)<br>OR<br>(commanded gear<br>AND<br>output speed)<br><br>primary oncoming clutch command<br><br>primary oncoming control state<br><br>(TCC stuck off enable<br>OR<br>TCC stuck on enable) | < desired engine speed - 50.0 RPM<br><br>= garage shift<br>= FALSE<br>= FALSE<br><br>= REVERSE<br><br>< 15.0 RPM<br><br>> FIRST GEAR<br><br>> -15.0 RPM<br><br>> Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset**<br><br># clutch fill<br><br>= 1 Boolean<br><br>= 1 Boolean | TCC stuck on fail time garage shift **P2818TCC stuck on fail time garage > shift -GR10** update fail count<br><br>when: fail count > 3 counts set DTC fault active<br><br>25 millisecond update rate | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | battery voltage | >9.00 volts | | |
| | | | | | run crank voltage | >9.00 volts | | |
| | | | | | diagnostic monitor enable | = 1 Boolean | battery voltage time > 0.100 seconds | |
| | | | | | PRNDL<br>commanded gear<br>PRNDL<br>commanded gear | # PARK<br># PARK<br># NEUTRAL<br># NEUTRAL | run crank voltage time > 0.100 seconds | |
| | | | | | TCC command mode<br>(PTO active<br>OR<br>PTO disable calibration) | = OFF<br>= FALSE<br><br>= 1 (0 to enable, 1 to disable) | | |
| | | | | | transmission fluid temperature<br>transmission fluid temperature | > -6.66 °C<br>< 130.00 °C | | |
| | | | | | engine torque<br>engine torque | > -25.0 Nm<br>< 800.0 Nm | | |
| | | | | | turbine speed | > cmnd gear turbine speed - 25.0 RPM | | |
| | | | | | P2818 test fail this key on | = FALSE | | |
| | | | | | engine speed<br>engine speed<br>accelerator pedal position<br>4WD low state<br>(driver shift mode active<br>OR<br>driver shift mode calibration) | > 200.0 RPM<br>< 1,000.0 RPM<br>< 5.0 %<br>= FALSE<br>= FALSE<br><br>= 0 (0 to enable, 1 to disable) | | |
| | | | | | clucth control solenoid | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | stuck ON AND stuck OFF<br>intrusive shift active<br><br>TOO solenoid pulse request<br><br>vehicle speed (not garage shift)<br>minimum turbine speed<br><br>DTCs not fault pending<br><br>DTCs not fault active | = FALSE<br><br>= FALSE<br><br>< 4.0 KPH<br>< set point engine speed - 50.0 RPM<br><br>P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821<br><br>AcceleratorPedalFailure<br>EngineTorqueEstInaccurate<br>P0716, P0717, P07BF, P07C0<br>P0722, P0723, P077C, P077D | | |
| | | | active clutch control<br><br>ABS(TCC slip speed)<br><br>engine torque<br><br>[(set point engine speed - actual engine speed)<br>OR<br>rate of change of engine speed]<br><br>update TOO stuck on stall | # garage shift<br><br>< 30.0 RPM<br><br>> 70.0 Nm<br><br>> 200.0 RPM<br><br>< -2,000 RPM/second | | | TOO stuck on stall pending time > **P2818TCC stuck on fail time stall pending - GR10**<br><br>when: fail count > 4 counts set DTC fault active<br><br>25 millisecond | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | pending time | | | | update rate | |
| | | | | | MIN(commanded or attained gear turbine speed) | < desired engine speed - 50.0 RPM | | |
| | | | | | active clutch control | # garage shift | | |
| | | | | | freewheel-to-lock shift | = FALSE | | |
| | | | | | lock-to-freewheel shift | = FALSE | | |
| | | | | | (commanded gear<br>AND<br>output speed)<br>OR<br>(commanded gear<br>AND<br>output speed) | = REVERSE<br><br>< -999,999.0 RPM<br><br>> FIRST GEAR<br><br>> 0.0 RPM | | |
| | | | | | primary oncoming clutch command | > Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset** | | |
| | | | | | (TCC stuck off enable<br>OR<br>TCC stuck on enable) | = 1 Boolean<br><br>= 1 Boolean | | |
| | | | | | battery voltage | >9.00 volts | | |
| | | | | | run crank voltage | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | diagnostic monitor enable | = 1 Boolean | run crank voltage time > 0.100 seconds | |
| | | | | | PRNDL | # PARK | | |
| | | | | | commanded gear | # PARK | | |
| | | | | | PRNDL | # NEUTRAL | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | commanded gear | # NEUTRAL | | |
| | | | | | TCC command mode | = OFF | | |
| | | | | | (PTO active<br>OR<br>PTO disable calibration) | = FALSE<br><br>= 1 (0 to enable, 1 to disable) | | |
| | | | | | transmission fluid temperature | > -6.66 °C | | |
| | | | | | transmission fluid temperature | < 130.00 °C | | |
| | | | | | engine torque | > -25.0 Nm | | |
| | | | | | engine torque | < 800.0 Nm | | |
| | | | | | turbine speed | > cmnd gear turbine speed - 25.0 RPM | | |
| | | | | | P2818 test fail this key on | = FALSE | | |
| | | | | | engine speed | > 200.0 RPM | | |
| | | | | | engine speed | < 1,000.0 RPM | | |
| | | | | | accelerator pedal position | < 5.0 % | | |
| | | | | | 4WD low state<br>(driver shift mode active<br>OR<br>driver shift mode calibration) | = FALSE<br>= FALSE<br><br>= 0 (0 to enable, 1 to disable) | | |
| | | | | | clucth control solenoid stuck ON AND stuck OFF intrusive shift active | = FALSE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | TCC solenoid pulse request<br><br>vehicle speed<br><br>minimum turbine speed<br><br>DTCs not fault pending<br><br>DTCs not fault active | = FALSE<br><br>< 15.0 KPH<br><br>< set point engine speed - 50.0 RPM<br><br>P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821<br><br>AcceleratorPedalFailure<br>EngineTorqueEstInaccurate<br>P0716, P0717, P07BF, P07C0, P0722, P0723, P077C, P077D | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid H Control Circuit Open | P281B | Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br>OR<br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br>OR<br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid H Control Circuit Low | P281D | Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D. | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid H Control Circuit High | P281E | Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control (PC) Solenoid J Stuck Off (GR10) | P2820 | Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition.<br><br>When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving | (gear ratio<br>AND<br>gear ratio)<br>OR<br>(gear ratio<br>AND<br>gear ratio)<br><br>(C1 clutch slip speed<br>C2 clutch slip speed<br>C3 clutch slip speed<br>C4 clutch slip speed<br><br>OR<br><br>C3 clutch slip speed<br>C4 clutch slip speed<br>05 clutch slip speed<br>06 clutch slip speed)<br><br>update fail time<br>6.25 milliscond update | > 1.020<br><br>< 0.980<br><br>> 0.980<br><br>< 1.020<br><br>< 50.00<br>< 50.00<br>< 50.00<br>< 50.00<br><br><br><br>< 50.00<br>< 50.00<br>< 50.00<br>< 50.00 | ********** | ********** | if engine torque <20.0 Nm<br>fail time < 0.50 sec<br><br>else<br>fail time = 0.25 seconds<br><br>6.25 milliscond update | Type A, 1 Trips |
| | | | | | system-level enables:<br><br>use battery voltage calibration is FALSE<br><br>OR<br><br>(use battery voltage calibration is TRUE<br><br>AND<br><br>battery voltage)<br><br>use run crank voltage calibration is FALSE<br>OR<br>(use run crank voltage calibration is TRUE<br>AND<br>run crank voltage)<br><br>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled<br><br>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>>9.00 volts<br><br>= TRUE Boolean<br><br>= TRUE Boolean | battery voltage time > 0.100 seconds<br><br>run crank voltage time > 0.100 seconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | and the control system is commanding a different gear, the solenoid fault can be detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve solenoid.<br><br>For GR10 non-ETRS applications, the stuck off solenoid can be detected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse. If the driver attempts unsucessfully to accelerate and then again shifts into drive, this 2nd shift triggers a neutral test which monitors input speed to confirm that the default disable solenoid is stuck off | | | service fast learn active<br><br>service solenoid cleaning procedure active<br><br>hydraulic pressure available<br><br>hydraulic line pressure<br>**********<br><br>conditions to trigger start of test:<br><br>(clutch control solenoid test state<br>OR<br>clutch control solenoid test state)<br><br>Offgoing clutch stuck on test result (for any clutch)<br><br>Default disable stuck off enable cal for tie-up events<br><br>current predicted hydraulic default gear if solenoid drivers are turned off<br>**********<br><br>conditions needed through duration of test:<br><br>attained gear<br><br>transmission output speed<br><br>driver direction reauest | = FALSE Boolean<br><br>= FALSE Boolean<br><br>= TRUE<br><br>> 10.00 kPa<br>**********<br><br>= Tie Up Test Active<br><br>= Tie Up Test Hold<br><br>= Test Failing<br><br>= 1 (1 to enable, 0 to disable)<br><br>= a drive gear (i.e. 2nd or 7th gear)<br>**********<br><br>= NEUTRAL<br><br>> 36.00 RPM<br><br>= FORWARD | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | ********** | ********** | | |
| | | | | | DTCs not fault pending | P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not test fail this key on | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not fault active | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | (gear ratio<br>AND<br>gear ratio)<br>OR<br>(gear ratio<br>AND | > 1.020<br><br>< 0.980<br><br>> 0.980 | | | if engine torque <20.0 Nm fail time <0.50 sec<br><br>else | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | gear ratio)<br><br>(C1 clutch slip speed<br>C2 clutch slip speed<br>C3 clutch slip speed<br>C4 clutch slip speed<br><br>OR<br><br>C3 clutch slip speed<br>C4 clutch slip speed<br>C5 clutch slip speed<br>C6 clutch slip speed)<br><br>update fail time<br>6.25 milliscond update | < 1.020<br><br>< 40.00<br>< 40.00<br>< 40.00<br>< 40.00<br><br><br><br>< 40.00<br>< 40.00<br>< 40.00<br>< 40.00 | ********** | ********** | fail time = 0.25 seconds<br><br>6.25 milliscond update | |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use battery voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | battery voltage) | >9.00 volts | battery voltage time > 0.100 seconds | |
| | | | | | use run crank voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR<br>(use run crank voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND<br>run crank voltage) | >9.00 volts | run crank voltage time > 0.100 seconds | |
| | | | | | TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning procedure active _____ | = FALSE Boolean | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | hydraulic pressure available | = TRUE | | |
| | | | | | (hydraulic line pressure | > 10.00 kPa | | |
| | | | | | OR<br>Clutch Stuck on in Park/ Neutral Fault Pending | = TRUE | | |
| | | | | | OR<br>Neutral Staging Line Pressure Disable) | =TRUE | | |
| | | | | | ********** | ********** | | |
| | | | | | conditions to trigger start of test: | | | |
| | | | | | clutch control solenoid test state | = Neutral Test State | | |
| | | | | | Default disable stuck off enable cal for startle events | = 0(1 to enable, 0 to disable) | | |
| | | | | | Startle Mitigation Active | = TRUE | | |
| | | | | | ********** | ********** | | |
| | | | | | conditions needed through duration of test: | | | |
| | | | | | current predicted hydraulic default gear if solenoid drivers are turned off | = a drive gear (i.e. 2nd or 7th gear) | | |
| | | | | | attained gear | = NEUTRAL | | |
| | | | | | driver direction request | = FORWARD | | |
| | | | | | ********** | ********** | | |
| | | | | | DTCs not fault pending | P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |
| | | | | | DTCs not test fail this key on | P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CEP1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA | | |
| | | | | | DTCs not fault active | P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B | | |
| | | | Input speed decel test: transmission input speed deceleration<br><br>neutral test to set DTC on next shift into drive: | > **P2820GR10 hydraulic default input speed deceleration threshold** | | | decel time: > 0.05 sec decel observed within **P2820 GR10 hydraulic default at launch test window** | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | transmission input speed | <100 RPM | | | neutral test fail time > 0.10 | |
| | | | | | ********** | ********** | 6.25 milliscond update | |
| | | | | | system-level enables: | | | |
| | | | | | use battery voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use battery voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | battery voltage) | >9.00 volts | | |
| | | | | | use run crank voltage calibration is FALSE | = 1 Boolean | | |
| | | | | | OR | | | |
| | | | | | (use run crank voltage calibration is TRUE | = 1 Boolean | | |
| | | | | | AND | | | |
| | | | | | run crank voltage) | >9.00 volts | | |
| | | | | | TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled | = TRUE Boolean | | |
| | | | | | service fast learn active | = FALSE Boolean | | |
| | | | | | service solenoid cleaning procedure active | = FALSE Boolean | | |
| | | | | | hvdraulic pressure_____ | = TRUE | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | available | | | |
| | | | | | (hydraulic pressure | > 10.00 kPa | | |
| | | | | | OR | | | |
| | | | | | Clutch Stuck on in Park/ Neutral fault pending | = TRUE | | |
| | | | | | OR | | | |
| | | | | | Neutral Staging Line Pressure Disable) | = TRUE | | |
| | | | | | ********** | ********** | | |
| | | | | | conditions needed to trigger decel test: | | | |
| | | | | | Driver direction change request | = TRUE | | |
| | | | | | Driver requested direction | = FORWARD | | |
| | | | | | default disable stuck off at launch enable cal | = 0(1 to enable, 0 to disable) | | |
| | | | | | ETRS system type | = CeTRGR_e_InternalETRS | | |
| | | | | | deceleration test on previous shift into drive failed | (CeTRGR_e_NoETRS to enable) | | |
| | | | | | P2820 Test Passed this Key on | = TRUE | | |
| | | | | | OR | | | |
| | | | | | (Multiple pass cal | = FALSE | | |
| | | | | | AND | | | |
| | | | | | Trans output speed since last pass) | = 0(1 to enable, 0 to disable) | | |
| | | | | | | | > 0.10 sec | |
| | | | | | Accelerator pedal position | > 36.0 RPM | | |
| | | | | | transmission input speed | | | |
| | | | | | transmission output speed | < 2.5 % | | |
| | | | | | ********** | < 900 RPM | | |
| | | | | | conditions needed throuah duration of decel | <**uxQ*j £*iyi********** | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | test: | | | |
| | | | | | commanded gear | | | |
| | | | | | Driver direction request | = NEUTRAL | | |
| | | | | | current predicted hydraulic default gear if solenoid drivers are turned off | = FORWARD | | |
| | | | | | transmission input speed | = a drive gear (i.e. 2nd) | | |
| | | | | | transmission output speed | < 900 RPM | | |
| | | | | | ********** | | | |
| | | | | | conditions needed to trigger neutral test: | *“**lrP*Q*f*t* ********** | | |
| | | | | | decel test failed | | All conditions met for > 1.00 sec, increment count, count > 1 , set FP | |
| | | | | | transmission output speed | | | |
| | | | | | attained gear direction | = TRUE | | |
| | | | | | brake pedal position | < 100 RPM | | |
| | | | | | park brake status | = FORWARD | | |
| | | | | | park brake status | < 5.00% | | |
| | | | | | accelerator pedal position | //APPLIED<br>//APPLY IN PROGRESS | | |
| | | | | | Driver direction change request | > 10.0 % | | |
| | | | | | driver requested direction | = TRUE | | |
| | | | | | transmission input speed | = FORWARD | | |
| | | | | | ********** | | | |
| | | | | | DTCs not fault pending | ***"1P*Q ********** | | |
| | | | | | DTCs not test fail this key | P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | on<br><br>DTCs not fault active | P2534 P0707 P0708<br>P0716 P0717 P07C0<br>P07BF P077D P077C<br>P126C P176D P17CC<br>P17CD P0962 P0966<br>P0970 P2720 P2729<br>P2738 P0963 P0967<br>P0971 P2721 P2730<br>P2739 P0960 P0964<br>P0968 P2718P2727<br>P2736 P17CE P1783<br>P17D3P17C5 P0721<br>AcceleratorPedalFailure<br>CrankSensor_FA<br><br>P0707 P0708 P0723<br>P0722 P176B P17D6<br>P0747 P0777 P0797<br>P2715 P2724 P2733<br>P0746 P0776 P0796<br>P2714 P2723 P2732,<br>P2818, P2821 P2820<br>P178F P17C6 P17C4<br>P17C7 P172AP172B | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid J Stuck On (Default Disable Solenoid Stuck On) (GRWOnly) | P2821 | The diagnostic monitor tests for the default disable solenoid stuck on hydraulically at engine start while the default disable solenoid has not failed electrically. The default disable solenoid feeds both the default disable valve but also feeds the ETRS hydraulic-mechanical (check-ball) valve. If the default disable solenoid is stuck on hydraulically, with the default disable solenoid providing a hydraulic pressure circuit to the ETRS hydraulic-mechanical (check-ball) valve at low transmission line pressure, the mode valve position sensor will indicate movement of the ETRS hydraulic-mechanical (check-ball) valve when it should not move during the engine start. | when:<br>mode valve solenoid commaned state<br><br>mode valve position<br><br>in park engine crank active (required to initiate test)<br><br>increment fail time<br><br>when fail time threshold met, increment fail count | = LOW<br><br>= HIGH<br><br>= TRUE | ETRS system type is internal ETRS<br><br>time since controller init<br>battery voltage<br><br>general mode valve diagnostic enable<br><br>default disable solenoid stuck on diagnostic enable<br><br>high side driver 1 or high side driver 2 is on<br><br>mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key)<br>AND<br>(P27EB, P27ED, P27EE Fault Active)<br><br>pump out available<br>engine speed<br>for<br>engine speed high time | =<br>CeTRGR_e_InternalETRS<br><br>> 0.01 seconds<br>>9.00 volts<br><br>= 1 Boolean<br><br>= 1 Boolean<br><br>= TRUE<br><br>= FALSE<br><br>= FALSE<br><br>= TRUE<br>> 250.00<br><br>><br>**Pump Out Available Transition Time** | fail time > 0.25 seconds<br><br>fail count > 2.00 counts<br><br>update rate 6.25 milliseconds | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid J Control Circuit Open (T93 Controller only) | P2824 | Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates an open circuit<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit | > 200 K Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid J Control Circuit Low | P2826 | Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826 | Voltage measurement outside of controller specific acceptable range indicates a ground short<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short | < 0.5 Q impedance between signal and controller ground<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and < 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>6.25 millisecond update rate<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Pressure Control Solenoid J Control Circuit High | P2827 | Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds. | Voltage measurement outside of controller specific acceptable range indicates a short to voltage<br><br>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage | < 0.5 Q impedance between signal and controller voltage source<br><br>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time | battery voltage<br><br>(run crank voltage<br>OR<br>accessory voltage active<br>OR<br>Power Mode)<br><br>diagnostic monitor enable calibration<br><br>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)<br><br>OR<br><br>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)<br><br>OR<br><br>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) | > 9.00 volts and<br>< 32.00 volts<br><br>>5.00 volts<br><br>= TRUE<br><br>= ACCESSORY<br><br>= 1 (1 is enable, 0 is disable)<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON<br><br>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)<br>= ON | fail time > 0.30 seconds out of sample time > 0.50 seconds<br><br>> 1.00 seconds<br><br>> 25 milliseconds<br><br>> 12.5 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 1 | P30D6 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >= 8.00 Volts,<br><br>else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the TCM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Serial Peripheral Interface Bus 2 | P30D7 | This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message. | This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor. | | Run/Crank voltage | >= 8.00 Volts, else the failure will be reported for all conditions | In the primary processor, 8/16 counts intermittent<br><br>12.5 ms /count in the TCM main processor | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| P3186 (Internal Control Module Security Peripheral Performance ) | P3186 | This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable. | MAC verification has falsely passed a configurable number of times. | 2.00 | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Communication Bus A Off | U0073 | This DTC monitors for a BUS A off condition | Bus off failures | >= 5.00 counts in a sliding window of 50 samples | General Enable Criteria:<br><br>Starter motor engaged for Or<br>Run/Crank ignition voltage<br><br>All below criteria have been met for<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled | > 15,000.00 milliseconds<br><br>>11.00 Volts<br><br>>= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts<br><br>>=11.00 Volts<br><br>Disabled | Samples every 100.00 milliseconds | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | <br><br><br><br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Power Steering Control Module | U0131 | This DTC monitors for a loss of communication with the Power Steering Control Module.<br><br>Emissions neutral default zero (0) steering angle rotation | Message is not received from controller for Message $023: | >10,000.00 milliseconds | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | >= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Emissions Neutral Diagnostics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Body Control Module | U0140 | This DTC monitors for a loss of communication with the Body Control Module. | Message is not received from controller for<br>Message $010:<br>Message $205:<br>Message $284:<br>Message $404:<br>Message $409:<br>Message $40C:<br>Message $413:<br>Message $460:<br>Message $461: | >10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds | General Enable Criteria:<br>All below criteria have been met for<br>If message is on Bus A: U0073 not active<br>If message is on Bus B: U0074 not active<br>If message is on Bus S: U0076 not active<br>CAN channel is requesting full communications<br>Normal CAN transmission on Bus is enabled<br>If bus type is Sensor Bus, sensor bus relay is on<br>Accessory mode to off mode not pending<br>Battery voltage<br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br>Controller type:<br>OBD Controller<br>If power mode = Run/ Crank:<br>Power Mode is run | >= 5,000.00 milliseconds<br>>11.00 Volts<br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Restraints Control Module | U0151 | This DTC monitors for a loss of communication with the Restraints Control Module.<br><br>Emissions neutral default zero (0) lateral acceleration and zero (0) longitudinal acceleration | Message is not received from controller for<br>Message $024:<br><br>Message $025:<br><br>Message $0D1:<br><br>Message $0D2:<br><br>Message $441: | <br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | >= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Emissions Neutral Diagnostics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From ECM/ PCM | U0401 | This DTC monitors for an error in communication with the ECM/PCM. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus. | | Executes in 12.5ms loop. | Type A, 1 Trips |
| | | | SD19PARC: | 8.00 fail counts out of 18.00 sample counts | All the following conditions are met for: | >= 5,000.00 milliseconds | | |
| | | | SrIDatl9_Prtctd: | 8.00 fail counts out of 18.00 sample counts | Battery voltage | >=11.00 volts | | |
| | | | SD18PARC: | 8.00 fail counts out of 18.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | SrIDatl8_Prtctd: | 8.00 fail counts out of 18.00 sample counts | If controller is a non-OBD controller then battery voltage | <=18.00 volts | | |
| | | | SD20P_ARC: | 8.00 fail counts out of 18.00 sample counts | Controller type: OBD Controller | | | |
| | | | SrlDat20_Prtctd: | 8.00 fail counts out of 18.00 sample counts | | | | |
| | | | SD71ARC: | 8.00 fail counts out of 18.00 sample counts | | | | |
| | | | SD71_CS: | 8.00 fail counts out of 18.00 sample counts | | | | |
| | | | VSADPARC: | 3.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 10.00 sample counts | | | | |
| | | | VehSpdAvgDrvn_Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SD26P_ARC: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SrlDat26_Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SD22P_ARC: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SrlDat22_Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | EVMESS2_ARC: | 8.00 fail counts out of 10.00 sample counts | | | | |
| | | | WDP-ARC: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | WhlDist-Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | CHCG_ARC: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Brake System Control Module | U0418 | This DTC monitors for an error in communication with the Brake System Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), orChecksum (CSLIM) of the following signals received over serial data is incorrect for: | | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus. | | Executes in 12.5ms loop. | Type B, 2 Trips |
| | | | SD16P_ARC: | 8.00 fail counts out of 10.00 sample counts | All the following conditions are met for: | >= 5,000.00 milliseconds | | |
| | | | SrIDatl6_Prtctd: | 8.00 fail counts out of 18.00 sample counts | Battery voltage | >=11.00 volts | | |
| | | | RATVCP-ARC: | 8.00 fail counts out of 18.00 sample counts | Accessory mode to off mode transition not pending | | | |
| | | | RrAxTrqValCmd-Prtctd: | 8.00 fail counts out of 18.00 sample counts | If controller is a non-OBD controller then battery voltage | <=18.00 volts | | |
| | | | BSIS2P_ARC: | 8.00 fail counts out of 10.00 sample counts | Controller type: OBD Controller | | | |
| | | | BrkSyslnfoSts2_Prtctd: | 2.00 fail counts out of 18.00 sample counts | | | | |
| | | | SWIP_ARC: | 8.00 fail counts out of 18.00 sample counts | | | | |
| | | | StrgWhllnfo-Prtctd: | 8.00 fail counts out of 18.00 sample counts | | | | |
| | | | SD15P_ARC: | 3.00 fail counts out of | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | 10.00 sample counts | | | | |
| | | | SrlDat15_Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SD17P_ARC: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | SrlDat17_Prtctd: | 3.00 fail counts out of 10.00 sample counts | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Power Steering Control Module | U0420 | This DTC monitors for an error in communication with the Power Steering Control Module.<br><br>Emissions neutral default zero (0) steering angle | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) of the following signals received over serial data is incorrect for:<br><br>SWIP_ARC:<br><br>StrgWhllnfo-Prtctd: | <br><br><br><br><br>8.00 fail counts out of 18.00 sample counts<br><br>8.00 fail counts out of 18.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br><br>>= 5,000.00 milliseconds<br><br>>=11.00 volts<br><br><br><br><br><br><br><=18.00 volts | Executes in 12.5ms loop. | Emissio ns Neutral Diagnost ics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Body Control Module | U0422 | This DTC monitors for an error in communication with the Body Control Module. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), orChecksum (CSLIM) of the following signals received over serial data is incorrect for:<br><br>SPMP-ARC:<br><br>SysPwrMode_P rtctd:<br><br>PltfTrnsTUDSwStARC: | <br><br><br><br>3.00 fail counts out of 10.00 sample counts<br><br>3.00 fail counts out of 10.00 sample counts<br><br>8.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br>>= 5,000.00 milliseconds<br><br>>=11.00 volts<br><br><br><br><br><br><=18.00 volts | Executes in 12.5ms loop. | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Gateway A | U0447 | This DTC monitors for an error in communication with the Gateway A. | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), orChecksum (CSLIM) of the following signals received over serial data is incorrect for:<br><br>BSPMP_ARC:<br><br>BkupSysPwrMode_Prtctd: | <br><br><br><br>3.00 fail counts out of 10.00 sample counts<br><br>3.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br>>= 5,000.00 milliseconds<br><br>>=11.00 volts<br><br><br><br><br><br><=18.00 volts | Executes in 12.5ms loop. | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received From Restraints Control Module | U0452 | This DTC monitors for an error in communication with the Restraints Control Module.<br><br>Emissions neutral default zero (0) lateral acceleration and zero (0) longitudinal acceleration | The signal value of the Alive Rolling Count (ARC),Protection Value (PV), orChecksum (CSLIM) of the following signals received over serial data is incorrect for:<br><br>SD47PARC:<br><br>SrlDat47_Prtctd: | <br><br><br><br>4.00 fail counts out of 10.00 sample counts<br><br>4.00 fail counts out of 10.00 sample counts | Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.<br><br>All the following conditions are met for:<br><br>Battery voltage<br><br>Accessory mode to off mode transition not pending<br><br>If controller is a non-OBD controller then battery voltage<br><br>Controller type:<br>OBD Controller | <br><br><br><br>>= 5,000.00 milliseconds<br><br>>=11.00 volts<br><br><br><br><br><br><=18.00 volts | Executes in 12.5ms loop. | Emissio ns Neutral Diagnost ics - Type C |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication With Gateway A on CAN 2 | U1608 | This DTC monitors for a loss of communication with the Gateway A on CAN 2. | Message is not received from controller for<br>Message $209:<br><br>Message $20D:<br><br>Message $427:<br><br>Message $561:<br><br>Message $562: | <br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds | General Enable Criteria:<br><br>All below criteria have been met for<br><br>If message is on Bus A: U0073 not active<br><br>If message is on Bus B: U0074 not active<br><br>If message is on Bus S: U0076 not active<br><br>CAN channel is requesting full communications<br><br>Normal CAN transmission on Bus is enabled<br><br>If bus type is Sensor Bus, sensor bus relay is on<br><br>Accessory mode to off mode not pending<br><br>Battery voltage<br><br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br><br>Controller type:<br>OBD Controller<br><br>If power mode = Run/ Crank:<br><br>Power Mode is run | >= 5,000.00 milliseconds<br><br>>11.00 Volts<br><br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Brake System Control Module 1 on CAN Bus 2 | U1610 | This DTC monitors for a loss of communication with the Brake System Control Module 1 on CAN Bus 2. | Message is not received from controller for<br>Message $012:<br>Message $014:<br>Message $015:<br>Message $017:<br>Message $01A:<br>Message $081:<br>Message $082:<br>Message $210:<br>Message $211:<br>Message $219:<br>Message $415:<br>Message $42A:<br>Message $4B2: | >10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds | General Enable Criteria:<br>All below criteria have been met for<br>If message is on Bus A: U0073 not active<br>If message is on Bus B: U0074 not active<br>If message is on Bus S: U0076 not active<br>CAN channel is requesting full communications<br>Normal CAN transmission on Bus is enabled<br>If bus type is Sensor Bus, sensor bus relay is on<br>Accessory mode to off mode not pending<br>Battery voltage<br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br>Controller type:<br>OBD Controller<br>If power mode = Run/ Crank:<br>Power Mode is run | >= 5,000.00 milliseconds<br>>11.00 Volts<br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type B, 2 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Message $4B4:<br><br>Message $4B5: | >10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with Engine Control Module on CAN Bus 2 | U1611 | This DTC monitors for a loss of communication with the Engine Control Module on CAN Bus 2. | Message is not received from controller for<br>Message $011:<br>Message $016:<br>Message $01C:<br>Message $01D:<br>Message $02A:<br>Message $084:<br>Message $086:<br>Message $087:<br>Message $097:<br>Message $213:<br>Message $214:<br>Message $21D:<br>Message $227: | >10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>418.75 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>387.50 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 milliseconds<br>>10,000.00 | General Enable Criteria:<br>All below criteria have been met for<br>If message is on Bus A: U0073 not active<br>If message is on Bus B: U0074 not active<br>If message is on Bus S: U0076 not active<br>CAN channel is requesting full communications<br>Normal CAN transmission on Bus is enabled<br>If bus type is Sensor Bus, sensor bus relay is on<br>Accessory mode to off mode not pending<br>Battery voltage<br>Conroller is an OBD controller<br>Or<br>Battery Voltage<br>Controller type:<br>OBD Controller<br>If power mode = Run/ Crank:<br>Power Mode is run | >= 5,000.00 milliseconds<br>>11.00 Volts<br><=18.00 Volts | Diagnostic runs in 12.5 ms loop | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | Message $229:<br><br>Message $22A:<br><br>Message $254:<br><br>Message $41D:<br><br>Message $41F:<br><br>Message $429:<br><br>Message $499:<br><br>Message $4BB:<br><br>Message $4BC:<br><br>Message $4BD:<br><br>Message $4C1: | milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds | If calibratable low voltage disable mode is not Never Disabled<br><br>If OBDII:<br>Run/Crank ignition voltage<br><br>If Secure:<br>Starter motor engaged for<br>Or<br>Run/Crank ignition voltage<br><br>If Hybrid Secure:<br>Run/Crank ignition voltage<br><br>If power mode = Accessory:<br><br>Off key cycle diagnostics are enabled<br>Or<br>Controller is an OBD controller<br><br>Controller shutdown is not impending<br><br>Power Mode is not run/ crank<br><br>Battery voltage | >=11.00 Volts<br><br>> 15,000.00 milliseconds<br><br>> 11.00 Volts<br><br>>= 8.00 Volts<br><br>Disabled<br><br>>=11.00 Volts | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | | | >10,000.00 milliseconds<br><br>>10,000.00 milliseconds<br><br>>10,000.00 milliseconds | | | | |
| | | | | | | | | |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned / Authoritative Counter At Maximum | U1960 | This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value | During controller initialization:<br><br>IF (Any Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(Any Authoritative Counter is at MAX value)<br><br>During controller operation:<br><br>IF (A Security Peripheral Key Slot reports as Empty)<br>-OR-<br>(An Authoritative Counter is at MAX value) | | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1961 (Security Peripheral Performance ) | U1961 | This DTC indicates that the ECU security peripheral has reported that it has failed. | The ECU security peripheral reports that the security peripheral hardware has failed. | | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| U1962 (Unable to Authenticate Serial Data Message) | U1962 | This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle. | Message authentication on a single key slot has failed a configurable number of times. | KeSSAR_Cnt_SecKey SlotFailLimit | Calibration enable | = 1.00 Boolean | | Type A, 1 Trips |

| Component/ System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation | U3023 | Detect a Power A vs RuncCrank correlation error | Power A - RunCrank - Voltage | > 3.00 | PowerA- RunCrank Correlation monitoring enable = TRUE<br><br>Battey Present<br><br>RunCrank Active<br><br>Starter Motor NOT Engaged | Diagnostc is 1.00<br><br>Battey Present = TRUE<br>RunCrank Active = TRUE<br><br>Starter Motor Engaged = FALSE | 40.00 failures out of 50.00 | Type A, 1 Trips |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

## Initial Supporting table - intermediate speed sensori or 2 predicted direction

**Description:**

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

## Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRReGear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRReGear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

## Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P2797 hydraulic pressure delay

**Description:** Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

**Value Units:** delay time seconds
**X Unit:** transmission fluid temperature DegC

| y/x | -40 | 0 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| 1 | 0.090 | 0.090 | 0.080 | 0.050 | 0.050 | 0.050 | 0.050 |

## Initial Supporting table - P2797 predicted turbine speed error

**Description:** Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

**Value Units:** turbine speed RPM error
**X Unit:** transmission fluid temperature DegC
**Y Units:** engine speed RPM

| y/x | -40 | 0 | 10 | 20 | 40 |
|---|---|---|---|---|---|
| 0 | 200 | 200 | 200 | 200 | 200 |
| 500 | 200 | 200 | 200 | 200 | 200 |
| 1,100 | 200 | 200 | 200 | 200 | 200 |
| 1,500 | 300 | 300 | 300 | 300 | 300 |
| 2,500 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

# Initial Supporting table - C1 exhaust delay closed throttle down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay garage shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C1 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C1 exhaust delay open throttle power down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay open throttle power on up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.500 | 1.000 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C1 Torque-Based Pressure Clip

**Description:** Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C1 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 690 | 690 | 690 | 690 | 690 |

# Initial Supporting table - C2 exhaust delay closed throttle down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay garage shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C2 exhaust delay negative torque up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C2 exhaust delay open throttle power down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay open throttle power on up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C2 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C2 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 400 | 500 | 500 | 500 |

# Initial Supporting table - C3 exhaust delay closed throttle down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay garage shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C3 exhaust delay negative torque up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C3 exhaust delay open throttle power down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay open throttle power on up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 3.000 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C3 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C3 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 400 | 500 | 575 | 800 |

# Initial Supporting table - C4 exhaust delay closed throttle down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay garage shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C4 exhaust delay negative torque up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C4 exhaust delay open throttle power down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay open throttle power on up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C4 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C4 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 400 | 650 | 750 | 800 | 900 |

# Initial Supporting table - C5 exhaust delay closed throttle down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay garage shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - C5 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C5 exhaust delay open throttle power down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay open throttle power on up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C5 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C5 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 600 | 700 | 750 | 900 |

# Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay garage shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C6 exhaust delay negative torque up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C6 exhaust delay open throttle power down shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay open throttle power on up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C6 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C6 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 350 | 650 | 750 | 800 | 950 |

# Initial Supporting table - Clutch Clip Press GS Shifts

**Description:** Oncoming clutch clip pressure for garage shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 750 | 850 | 400 | 400 | 400 |

# Initial Supporting table - Clutch Clip Press NU Shifts

**Description:** Oncoming clutch clip pressure for negative torque up shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 450 | 450 | 600 | 450 | 450 |

# Initial Supporting table - Clutch Clip Press PD Shifts

**Description:** Oncoming clutch clip pressure for open throttle power down shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 500 | 600 | 750 | 750 | 500 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

**Description:** Used for closed throttle down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

**Description:** Used for garage shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

**Description:** Used for open throttle power down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

**Description:** Used for powered up shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

**Description:** Used for clutch staging shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Shift Type Enable

**Description:** Calibration to enable the clutch stuck on test for each shift type

**XUnit:** Shift Type
**Y Units:** Boolean

| y/x | CeTSER_e_STGR | CeTSER_e_GSCR | CeTSER_e_NUCR | CeTSER_e_PUCR | CeTSER_e_CDCR | CeTSER_e_PDCR | CeTSER_e_CLAR |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

## Initial Supporting table - intermediate speed sensori or 2 predicted direction

**Description:** intermediate speed sensor 1 or 2 predicted direction

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

# Initial Supporting table - P0606 PFM Sequence Fail f(Loop Time)

**Description:** Fail threshold for PFM per operating loop.

**Value Units:** Fail threshold for PFM (count)
**X Unit:** Operating Loop (enum)

| P0606 PFM Sequence Fail f(Loop Time) - Part 1 | | | | |
|---|---|---|---|---|
| y/x | CePISR_e_2p5msFlow | CePISR_e_3p125msFlow | CePISR_e_5msFlow | CePISR_e_6p25msFlow |
| 1 | 8 | 8 | 8 | 8 |
| **P0606 PFM Sequence Fail f(Loop Time) - Part 2** | | | | |
| y/x | CePISR_e_1OmsFlow | CePISR_e_12p5msFlow | CePISR_e_20msFlow | CePISR_e_25msFlow |
| 1 | 8 | 8 | 8 | 8 |
| **P0606 PFM Sequence Fail f(Loop Time) - Part 3** | | | | |
| y/x | CePISR_e_40msFlow | CePISR_e_50msFlow | CePISR_e_80msFlow | CePISR_e_1OOmsFlow |
| 1 | 4 | 4 | 2 | 2 |
| **P0606 PFM Sequence Fail f(Loop Time) - Part 4** | | | | |
| y/x | CePISR_e_250msFlow | | | |
| 1 | 2 | | | |

# Initial Supporting table - P0606 PFM Sequence Sample f(Loop Time)

**Description:** Sample threshold for PFM per operating loop.

**Value Units:** Sample threshold for PFM (count)
**X Unit:** Operating Loop (enum)

| P0606 PFM Sequence Sample f(Loop Time) - Part 1 | | | | |
|---|---|---|---|---|
| y/x | CePISR_e_2p5msFlow | CePISR_e_3p125msFlow | CePISR_e_5msFlow | CePISR_e_6p25msFlow |
| 1 | 10 | 10 | 10 | 10 |
| **P0606 PFM Sequence Sample f(Loop Time) - Part 2** | | | | |
| y/x | CePISR_e_1OmsFlow | CePISR_e_12p5msFlow | CePISR_e_20msFlow | CePISR_e_25msFlow |
| 1 | 10 | 10 | 10 | 10 |
| **P0606 PFM Sequence Sample f(Loop Time) - Part 3** | | | | |
| y/x | CePISR_e_40msFlow | CePISR_e_50msFlow | CePISR_e_80msFlow | CePISR_e_1OOmsFlow |
| 1 | 5 | 5 | 3 | 3 |
| **P0606 PFM Sequence Sample f(Loop Time) - Part 4** | | | | |
| y/x | CePISR_e_250msFlow | | | |
| 1 | 3 | | | |

# Initial Supporting table - P0606 PFM  Enable f(Loop Time)

**Description:** PFM Enable

**Value Units:** PFM enable flag (boolean)
**X Unit:** Operating Loop Time Sequence (enum)

| **P0606 PFM.Enable  f(Loop Time) - Part 1** | | | | |
|---|---|---|---|---|
| y/x | CePISR_e_2p5msFlow | CePISR_e_3p125msFlow | CePISR_e_5msFlow | CePISR_e_6p25msFlow |
| 1 | 0 | 0 | 0 | 0 |
| **P0606 PFM.Enable  f(Loop Time) - Part 2** | | | | |
| y/x | CePISR_e_1OmsFlow | CePISR_e_12p5msFlow | CePISR_e_20msFlow | CePISR_e_25msFlow |
| 1 | 0 | 0 | 0 | 0 |
| **P0606 PFM.Enable  f(Loop Time) - Part 3** | | | | |
| y/x | CePISR_e_40msFlow | CePISR_e_50msFlow | CePISR_e_80msFlow | CePISR_e_1OOmsFlow |
| 1 | 0 | 0 | 0 | 0 |
| **P0606 PFM.Enable  f(Loop Time) - Part 4** | | | | |
| y/x | CePISR_e_250msFlow | | | |
| 1 | 0 | | | |

# Initial Supporting table - P0741 GR10 torque converter K factor fail limit

**Description:**

**Value Units:** transmission torque converter K factor
**X Unit:** transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

| y/x | 0.000 | 0.100 | 0.200 | 0.300 | 0.500 | 0.700 | 0.800 | 0.945 | 0.950 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 400.0 | 300.0 | 225.0 | 200.0 | 200.0 | 200.0 | 250.0 | 1,000.0 | 16,383.8 |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRReGear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRReGear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

## Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1 | 4.00 | 2.00 | 1.00 | 0.80 | 0.80 |

# Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.80 | 2.40 | 1.20 | 1.20 | 1.20 |

# Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2.40 | 1.20 | 0.60 | 0.60 | 0.60 |

# Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.60 | 0.80 | 0.25 | 0.07 | 0.07 |

# Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.70 | 2.00 | 0.80 | 0.43 | 0.26 |

# Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.20 | 0.60 | 0.20 | 0.10 | 0.08 |

# Initial Supporting table - P18AE Enable Valve Test Delay

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.50 | 0.30 | 0.16 | 0.08 | 0.08 |

# Initial Supporting table - P2797 hydraulic pressure delay

**Description:** Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

**Value Units:** delay time seconds
**X Unit:** transmission fluid temperature DegC

| y/x | -40 | 0 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| 1 | 0.090 | 0.090 | 0.080 | 0.050 | 0.050 | 0.050 | 0.050 |

## Initial Supporting table - P2797 predicted turbine speed error

**Description:** Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

**Value Units:** turbine speed RPM error
**X Unit:** transmission fluid temperature DegC
**Y Units:** engine speed RPM

| y/x | -40 | 0 | 10 | 20 | 40 |
|---|---|---|---|---|---|
| 0 | 200 | 200 | 200 | 200 | 200 |
| 500 | 200 | 200 | 200 | 200 | 200 |
| 1,100 | 200 | 200 | 200 | 200 | 200 |
| 1,500 | 300 | 300 | 300 | 300 | 300 |
| 2,500 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

**Value Units:** RPM
**X Unit:** engine torque Nm

| y/x | 0.00 | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 50.0 | 100.0 | 100.0 | 150.0 | 200.0 | 250.0 | 250.0 | 250.0 |

# Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

**Description:** GR10 P2818 TCC stuck on fail time garage shift

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.200 | 0.125 | 0.100 | 0.100 |

# Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

**Description:** GR10 P2818 TCC stuck on fail time stall pending

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.300 | 0.300 | 0.200 | 0.100 |

# Initial Supporting table - P2820 GR10 hydraulic default at launch test window

**Description:**

**Value Units:** RPM/sec
**X Unit:** °C

| y/x | -10 | 5 | 15 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 1 |

# Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

**Description:** Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

**Value Units:** RPM/sec
**X Unit:** °C

| y/x | -10 | 5 | 15 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | -32,768 | -32,768 | -3,500 | -2,000 | -2,000 |

# Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

**Description:**

**Value Units:** kPa
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 |

# Initial Supporting table - Pump Out Available Transition Time

**Description:**

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 |

# Initial Supporting table - speed sensor directional rationality enable calibration

**Description:** speed sensor directional rationality enable calibration

**Value Units:** Boolean
**X Unit:** scheduled gear
**Y Units:** unitless

| y/x | CeCGSR_FwdCmded | CeCGSR-NeutCmded | CeCGSR_RvrsCmded | CeCGSR-ParkCmded |
|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 1 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

# Initial Supporting table - Clutch Connectivity C1 On Threshold

**Description:** Pressure command above which C1 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C2 On Threshold

**Description:** Pressure command above which C2 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C3 On Threshold

**Description:** Pressure command above which C3 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C4 On Threshold

**Description:** Pressure command above which C4 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C5 On Threshold

**Description:** Pressure command above which C5 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C6 On Threshold

**Description:** Pressure command above which C6 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C7 On Threshold

**Description:** Pressure command above which SOWC will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - Clutch Connectivity Wrong Direction FP

**Description:** Fault pending time for cluch connectivity detecting wrong direction

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Gain

**Description:** Gain value to convert clutch pressure command to regulator valve command

**Value Units:** Gain (unitless)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Offset

**Description:** Offset value to convert clutch pressure command to regulator valve command

**Value Units:** offset (kPa)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 59 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 4,096 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 4,096 | 69 | 312 |
| CeTRMR_e_C4_Clutch | 116 | 116 | 116 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 30 | 30 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 4,096 | 4,096 | 50 | 50 | 50 | 4,096 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 69 | 4,096 | 69 | 312 | 4,096 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 116 | 4,096 | 116 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 57 | 4,096 | 209 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 30 | 30 | 52 | 30 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 63 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 50 | 55 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 574 | 69 | 4,096 | 4,096 | 4,096 | 312 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 621 | 4,096 | 116 | 621 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 4,096 | 329 | 4,096 |
| CeTRMR_e_C6_Clutch | 52 | 30 | 4,096 | 52 | 30 | 4,096 | 141 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 4,096 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 50 | 4,096 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 69 | 4,096 | 69 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 116 | 116 | 116 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 57 | 209 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 30 | 30 | 30 | 52 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 4,096 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 312 | 69 | 4,096 | 69 | 4,096 | 69 | 574 |

## Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 116 | 621 | 4,096 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 4,096 | 57 | 4,096 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 4,096 | 4,096 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 59 | 63 | 59 | 59 | 62 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 4,096 | 50 | 55 | 50 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 312 | 69 | 69 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 621 | 4,096 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 209 | 4,096 | 329 | 4,096 | 57 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 52 | 30 | 4,096 | 141 | 4,096 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 77 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 4,096 | 209 | 209 | 4,096 | 329 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 52 | 52 | 141 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8 | | | | | | | |
|---|---|---|---|---|---|---|---|
| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 96 | 62 | 59 | 63 | |
| CeTRMR_e_C2_Clutch | 55 | 50 | 144 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 312 | 4,096 | 574 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 741 | 4,096 | 4,096 | 4,096 | 621 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 639 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 158 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 4,096 | 134 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 4,096 | 187 | 842 |
| CeTRMR_e_C4_Clutch | 313 | 313 | 313 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 82 | 82 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 4,096 | 4,096 | 134 | 134 | 135 | 4,096 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 187 | 4,096 | 187 | 842 | 4,096 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 153 | 4,096 | 564 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 82 | 82 | 142 | 82 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 171 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 134 | 148 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 1,550 | 187 | 4,096 | 4,096 | 4,096 | 842 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 1,676 | 4,096 | 313 | 1,676 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 4,096 | 889 | 4,096 |
| CeTRMR_e_C6_Clutch | 142 | 82 | 4,096 | 142 | 82 | 4,096 | 380 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 4,096 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 134 | 4,096 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 187 | 4,096 | 187 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 313 | 313 | 313 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 153 | 564 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 82 | 82 | 82 | 142 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 4,096 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 135 | 134 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 842 | 187 | 4,096 | 187 | 4,096 | 187 | 1,550 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 313 | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 4,096 | 153 | 4,096 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 4,096 | 4,096 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 158 | 171 | 158 | 158 | 166 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 4,096 | 134 | 148 | 134 | 135 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 842 | 187 | 187 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 1,676 | 4,096 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 564 | 4,096 | 889 | 4,096 | 153 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 142 | 82 | 4,096 | 380 | 4,096 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 207 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 4,096 | 564 | 564 | 4,096 | 889 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 142 | 142 | 380 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8**

| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 259 | 166 | 158 | 171 | |
| CeTRMR_e_C2_Clutch | 148 | 135 | 388 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 842 | 4,096 | 1,550 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 2,000 | 4,096 | 4,096 | 4,096 | 1,676 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 1,725 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

**Description:** Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

**Value Units:** Pressure (kPa)
**X Unit:** Possible Output Tie-up Combination (unitless)
**Y Units:** Clutch

| y/x | CeTCLR_e_TUM_OutLockl | CeTCLR_e_TUM_OutLock2 | CeTCLR_e_TUM_OutLock3 | CeTCLR_e_TUM_OutLock4 | CeTCLR_e_TUM_OutLock5 | CeTCLR_e_TUM_OutLock6 | CeTCLR_e_TUM_OutLock7 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C2_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C3_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C4_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C5_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C6_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C7_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - Illegal Drive Clutch Combinations

**Description:** All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

| y/x | CeTRMR_e_IllegalDrv_Rev1 | CeTRMR_e_IllegalDrv_Rev2 |
|---|---|---|
| CeTRMR_e_C1_Clutch | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 |

# Initial Supporting table - Illegal Park-Neutral Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Park-Neutral Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalPN_Rev | CeTRMR.e_IllegalPN.1A | CeTRMR.e.IllegalPN.I Ac | CeTRMR.e.IllegalPN.I Ad | CeTRMR.e.IllegalPN.I Af |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 2**

| y/x | CeTRMR.e.IllegalPN.I M | CeTRMR.e.IllegalPN.I Me | CeTRMR.e.IllegalPN.I Md | CeTRMR.e.IllegalPN.I Mf | CeTRMR_eJllegalPN_2A |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalPN_2M | CeTRMR_eJllegalPN_3 | CeTRMR_eJllegalPN_4 | CeTRMR_eJllegalPN_5 | CeTRMR_eJllegalPN_6 |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 4**

| y/x | CeTRMR_e_IllegalPN_7 | CeTRMR_eJllegalPN_8 | CeTRMR_eJllegalPN_9 | CeTRMR.e.IllegalPN.I 0 | |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 0 | 0 | 0 | 0 | |
| CeTRMR_e_C2_Clutch | 0 | 1 | 1 | 1 | |

## Initial Supporting table - Illegal Park-Neutral Clutch Combinations

| | | | | | |
|---|---|---|---|---|---|
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTRMR_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 0 | |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | |

# Initial Supporting table - Illegal Reverse Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Reverse Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalRev_1A | CeTRMR_e_IllegalRev_1Ac | CeTRMR_e_IllegalRev_1Ad | CeTRMR_e_IllegalRev_1Af | CeTRMR_e_IllegalRev_1M | CeTRMR_e_IllegalRev_1Me |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 0 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 0 | 0 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 2**

| y/x | CeTRMR_e_IllegalRev_1Md | CeTRMR_e_IllegalRev_1Mf | CeTRMR_e_l11egalRev_2A | CeTRMR_e_l11egalRev_2M | CeTRMR_e_IllegalRev_3 | CeTRMR_e_l11egalRev_4 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalRev_5 | CeTRMR_e_l11egalRev_6 | CeTRMR_e_IllegalRev_7 | CeTRMR_e_IllegalRev_8 | CeTRMR_e_l11egalRev_9 | CeTRMR_e_IllegalRev_10 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Direction Range Change Delay Time

**Description:** Time delay after PRNDL change before incorrect direction monitor will be enabled

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Incorrect Drive Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded drive condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Neutral Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded neutral condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Park Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded park condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Reverse Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded reverse condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

## Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

**Description:** intermediate speed sensor 1 or 2 predicted direction

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

# Initial Supporting table - P0723 (MY21) transmission engaged state time threshold

**Description:** time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

**Value Units:** seconds
seconds

| y/x | -40 | 0 | 40 |
|---|---|---|---|
| 1 | 5 | 3 | 1 |

# Initial Supporting table - P0723 Wheel Speed Calc

**Description:**

| y/x | 400 | 500 | 600 | 700 | 800 |
|---|---|---|---|---|---|
| 1 | 300 | 375 | 450 | 525 | 600 |

# Initial Supporting table - P0741 GR10 torque converter K factor fail limit

**Description:**

**Value Units:** transmission torque converter K factor
**X Unit:** transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

| y/x | 0.000 | 0.100 | 0.200 | 0.300 | 0.500 | 0.700 | 0.800 | 0.945 | 0.950 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 400.0 | 300.0 | 225.0 | 200.0 | 200.0 | 200.0 | 250.0 | 1,000.0 | 16,383.8 |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRReGear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRReGear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1 | 4.00 | 2.00 | 1.00 | 0.80 | 0.80 |

## Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

**Description:** Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.80 | 2.40 | 1.20 | 1.20 | 1.20 |

# Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2.40 | 1.20 | 0.60 | 0.60 | 0.60 |

# Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.60 | 0.80 | 0.25 | 0.07 | 0.07 |

# Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

**Description:** Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.70 | 2.00 | 0.80 | 0.43 | 0.26 |

# Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.20 | 0.60 | 0.20 | 0.10 | 0.08 |

# Initial Supporting table - P18AE Enable Valve Test Delay

**Description:** Time enable conditions must be met before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.50 | 0.30 | 0.16 | 0.08 | 0.08 |

# Initial Supporting table - P18AE Max Crank Time

**Description:** TestAbort Crank Time

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40 | -20 | 0 | 20 | 130 |
|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 5 | 5 |

# Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

**Value Units:** RPM
**X Unit:** engine torque Nm

| y/x | 0.00 | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 50.0 | 100.0 | 100.0 | 150.0 | 200.0 | 250.0 | 250.0 | 250.0 |

# Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

**Description:** Primary Oncoming Clutch Capacity Offset from return spring pressure

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 50 | 50 | 50 | 50 | 40 | 50 |

# Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

**Description:** GR10 P2818 TCC stuck on fail time garage shift

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.200 | 0.125 | 0.100 | 0.100 |

# Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

**Description:** GR10 P2818 TCC stuck on fail time stall pending

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.300 | 0.300 | 0.200 | 0.100 |

# Initial Supporting table - P2820 GR10 hydraulic default at launch test window

**Description:**

**Value Units:** RPM/sec
**X Unit:** °C

| y/x | -10 | 5 | 15 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 1 |

# Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

**Description:** Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

**Value Units:** RPM/sec
**X Unit:** °C

| y/x | -10 | 5 | 15 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | -32,768 | -32,768 | -3,500 | -2,000 | -2,000 |

# Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

**Description:** Line pressure that is expected to be able to overcome the PISA and force the transmission into Park,  looked up based on transmission fluid temperature

**Value Units:** kPa
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 |

# Initial Supporting table - Pump Out Available Transition Time

**Description:** Delay before pump out available flag is set TRUE, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 |

# Initial Supporting table - Ratio Monitor Clutch States

**Description:** Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

**Value Units:** Clutch Held Boolean
**X Unit:** Gear
**Y Units:** Clutch

**Ratio Monitor Clutch States - Part 1**

| y/x | CeTRMR_e_GRX_GearR | CeTRMR_e_GRX_Gear1A | CeTRMR_e_GRX_Gear1Ac | CeTRMR_e_GRX_Gear1Ad | CeTRMR_e_GRX_Gear1Af |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTSER_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTSER_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTSER_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |

**Ratio Monitor Clutch States - Part 2**

| y/x | CeTRMR_e_GRX_Gear1M | CeTRMR_e_GRX_Gear1Me | CeTRMR_e_GRX_Gear1Md | CeTRMR_e_GRX_Gear1Mf | CeTRMR_e_GRX_Gear2A |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTSER_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |

**Ratio Monitor Clutch States - Part 3**

| y/x | CeTRMR_e_GRX_Gear2M | CeTRMR_e_GRX_Gear3 | CeTRMR_e_GRX_Gear4 | CeTRMR_e_GRX_Gear5 | CeTRMR_e_GRX_Gear6 |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTSER_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |

**Ratio Monitor Clutch States - Part 4**

| y/x | CeTRMR_e_GRX_Gear7 | CeTRMR_e_GRX_Gear8 | CeTRMR_e_GRX_Gear9 | CeTRMR_e_GRX_Gear10 | |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 0 | 0 | 0 | 0 | |
| CeTSER_e_C2_Clutch | 0 | 1 | 1 | 1 | |
| CeTSER_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTSER_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 0 | |

## Initial Supporting table - Ratio Monitor Clutch States

| | | | | | |
|---|---|---|---|---|---|
| CeTS ER_e_C6_CI utch | h | h | h | h | |

# Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

**Description:** Ratio Monitor Fail Increment Rate

**Value Units:** Percent Increment Per Loop
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Ratio Monitor Slip Threshold

**Description:** Threshold slip value below which the clutch is considered holding

**Value Units:** clutch slip (RPM)
**X Unit:** Clutch

| y/x | CeTRMR_e_ClchSlipC1 | CeTRMR_e_ClchSlipC2 | CeTRMR_e_ClchSlipC5 | CeTRMR_e_ClchSlipC3C4 | CeTRMR_e_ClchSlipC3C6 | CeTRMR_e_ClchSlipC4C6 |
|---|---|---|---|---|---|---|
| 1 | 30 | 30 | 30 | 25 | 25 | 25 |

# Initial Supporting table - Shift Monitor Lowest Allowed Gear

**Description:** Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

**Value Units:** Vehicle Speed (kph)
**X Unit:** Transfer Case Range
**Y Units:** Lowest Allowed Gear

| y/x | CeTCLR_e_4WD_Hi | CeTCLR_e_4WD_Lo |
|---|---|---|
| CeTGRR_e_Gear1 | 64 | 24 |
| CeTGRR_e_Gear2 | 101 | 37 |
| CeTGRR_e_Gear3 | 140 | 52 |
| CeTGRR_e_Gear4 | 170 | 63 |
| CeTGRR_e_Gear5 | 198 | 73 |
| CeTGRR_e_Gear6 | 236 | 87 |
| CeTGRR_e_Gear7 | 301 | 111 |
| CeTGRR_e_Gear8 | 352 | 131 |
| CeTGRR_e_Gear9 | 437 | 162 |
| CeTGRR_e_Gear10 | 473 | 175 |

# Initial Supporting table - speed sensor directional rationality enable calibration

**Description:** speed sensor directional rationality enable calibration

**Value Units:** Boolean
**X Unit:** scheduled gear
**Y Units:** unitless

| y/x | CeCGSR_FwdCmded | CeCGSR-NeutCmded | CeCGSR_RvrsCmded | CeCGSR-ParkCmded |
|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 1 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

# Initial Supporting table - C1 Clutch Clip Press CD Shifts

**Description:** C1 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C1 exhaust delay closed throttle down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay garage shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C1 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C1 exhaust delay open throttle power down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay open throttle power on up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.500 | 1.000 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C1 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C
**Y Units:** unitless

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C1 Torque-Based Pressure Clip

**Description:** Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C1 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 690 | 690 | 690 | 690 | 690 |

# Initial Supporting table - C2 Clutch Clip Press CD Shifts

**Description:** C2 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C2 exhaust delay closed throttle down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay garage shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C2 exhaust delay negative torque up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C2 exhaust delay open throttle power down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay open throttle power on up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C2 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C2 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C2 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 400 | 500 | 500 | 500 |

# Initial Supporting table - C3 Clutch Clip Press CD Shifts

**Description:** C3 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C3 exhaust delay closed throttle down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay garage shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C3 exhaust delay negative torque up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C3 exhaust delay open throttle power down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay open throttle power on up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 3.000 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C3 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C3 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C3 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 400 | 500 | 575 | 800 |

# Initial Supporting table - C4 Clutch Clip Press CD Shifts

**Description:** C4 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C4 exhaust delay closed throttle down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay garage shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C4 exhaust delay negative torque up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C4 exhaust delay open throttle power down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay open throttle power on up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C4 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C4 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C4 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 400 | 650 | 750 | 800 | 900 |

# Initial Supporting table - C5 Clutch Clip Press CD Shifts

**Description:** C5 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C5 exhaust delay closed throttle down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay garage shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - C5 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C5 exhaust delay open throttle power down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay open throttle power on up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C5 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C5 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C5 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 300 | 600 | 700 | 750 | 900 |

# Initial Supporting table - C6 Clutch Clip Press CD Shifts

**Description:** C6 oncoming clutch clip pressure for closed throttle down shifts

**Value Units:** kPa
**X Unit:** clutch torque Nm
**Y Units:** unitless

| y/x | 0.0 | 50.0 | 100.0 | 200.0 | 300.0 |
|---|---|---|---|---|---|
| 1 | 400.0 | 400.0 | 400.0 | 400.0 | 400.0 |

# Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay garage shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C6 exhaust delay negative torque up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C6 exhaust delay open throttle power down shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay open throttle power on up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C6 Oncoming Post-Torque Phase Delay

**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40.0 | -20.0 | 0.0 | 30.0 | 110.0 |
|---|---|---|---|---|---|
| 1 | -0.250 | -0.250 | -0.250 | -0.250 | -0.250 |

# Initial Supporting table - C6 Torque-Based Pressure Clip

**Description:**

**Value Units:** Clutch Pressure (kPa)
**X Unit:** C6 Oncoming Clutch Torque (Nm)

| y/x | 0 | 100 | 200 | 300 | 600 |
|---|---|---|---|---|---|
| 1 | 350 | 650 | 750 | 800 | 950 |

# Initial Supporting table - Clutch Clip Press GS Shifts

**Description:** Oncoming clutch clip pressure for garage shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 750 | 850 | 400 | 400 | 400 |

# Initial Supporting table - Clutch Clip Press NU Shifts

**Description:** Oncoming clutch clip pressure for negative torque up shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 450 | 450 | 600 | 450 | 450 |

# Initial Supporting table - Clutch Clip Press PD Shifts

**Description:** Oncoming clutch clip pressure for open throttle power down shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 500 | 600 | 750 | 750 | 500 |

# Initial Supporting table - Clutch Connectivity C1 On Threshold

**Description:** Pressure command above which C1 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C1 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C2 On Threshold

**Description:** Pressure command above which C2 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C2 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C3 On Threshold

**Description:** Pressure command above which C3 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C3 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C4 On Threshold

**Description:** Pressure command above which C4 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C4 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C5 On Threshold

**Description:** Pressure command above which C5 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C5 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C6 On Threshold

**Description:** Pressure command above which C6 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C6 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C7 On Threshold

**Description:** Pressure command above which C7 will be considered commanded on

**Value Units:** kPa
**X Unit:** transmission fluid temperature °C
**Y Units:** C7 clutch

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - Clutch Connectivity Wrong Direction FP

**Description:** Fault pending time for cluch connectivity detecting wrong direction

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Gain

**Description:** Gain value to convert clutch pressure command to regulator valve command

**Value Units:** Gain (unitless)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Offset

**Description:** Offset value to convert clutch pressure command to regulator valve command

**Value Units:** offset (kPa)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

**Description:** Used for closed throttle down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

**Description:** Used for garage shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

**Description:** Used for open throttle power down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

**Description:** Used for powered up shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

**Description:** Used for clutch staging shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Shift Type Enable

**Description:** Calibration to enable the clutch stuck on test for each shift type

**XUnit:** Shift Type
**Y Units:** Boolean

| y/x | CeTSER_e_STGR | CeTSER_e_GSCR | CeTSER_e_NUCR | CeTSER_e_PUCR | CeTSER_e_CDCR | CeTSER_e_PDCR | CeTSER_e_CLAR |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 59 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 4,096 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 4,096 | 69 | 312 |
| CeTRMR_e_C4_Clutch | 116 | 116 | 116 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 30 | 30 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 4,096 | 4,096 | 50 | 50 | 50 | 4,096 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 69 | 4,096 | 69 | 312 | 4,096 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 116 | 4,096 | 116 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 57 | 4,096 | 209 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 30 | 30 | 52 | 30 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 63 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 50 | 55 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 574 | 69 | 4,096 | 4,096 | 4,096 | 312 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 621 | 4,096 | 116 | 621 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 4,096 | 329 | 4,096 |
| CeTRMR_e_C6_Clutch | 52 | 30 | 4,096 | 52 | 30 | 4,096 | 141 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 4,096 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 50 | 4,096 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 69 | 4,096 | 69 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 116 | 116 | 116 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 57 | 209 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 30 | 30 | 30 | 52 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 4,096 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 312 | 69 | 4,096 | 69 | 4,096 | 69 | 574 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 116 | 621 | 4,096 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 4,096 | 57 | 4,096 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 4,096 | 4,096 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 59 | 63 | 59 | 59 | 62 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 4,096 | 50 | 55 | 50 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 312 | 69 | 69 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 621 | 4,096 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 209 | 4,096 | 329 | 4,096 | 57 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 52 | 30 | 4,096 | 141 | 4,096 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 77 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 4,096 | 209 | 209 | 4,096 | 329 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 52 | 52 | 141 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8 | | | | | | | |
|---|---|---|---|---|---|---|---|
| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 96 | 62 | 59 | 63 | |
| CeTRMR_e_C2_Clutch | 55 | 50 | 144 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 312 | 4,096 | 574 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 741 | 4,096 | 4,096 | 4,096 | 621 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 639 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 158 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 4,096 | 134 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 4,096 | 187 | 842 |
| CeTRMR_e_C4_Clutch | 313 | 313 | 313 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 82 | 82 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 4,096 | 4,096 | 134 | 134 | 135 | 4,096 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 187 | 4,096 | 187 | 842 | 4,096 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 153 | 4,096 | 564 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 82 | 82 | 142 | 82 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 171 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 134 | 148 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 1,550 | 187 | 4,096 | 4,096 | 4,096 | 842 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 1,676 | 4,096 | 313 | 1,676 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 4,096 | 889 | 4,096 |
| CeTRMR_e_C6_Clutch | 142 | 82 | 4,096 | 142 | 82 | 4,096 | 380 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 4,096 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 134 | 4,096 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 187 | 4,096 | 187 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 313 | 313 | 313 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 153 | 564 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 82 | 82 | 82 | 142 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 4,096 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 135 | 134 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 842 | 187 | 4,096 | 187 | 4,096 | 187 | 1,550 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 313 | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 4,096 | 153 | 4,096 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 4,096 | 4,096 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 158 | 171 | 158 | 158 | 166 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 4,096 | 134 | 148 | 134 | 135 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 842 | 187 | 187 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 1,676 | 4,096 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 564 | 4,096 | 889 | 4,096 | 153 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 142 | 82 | 4,096 | 380 | 4,096 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 207 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 4,096 | 564 | 564 | 4,096 | 889 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 142 | 142 | 380 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8**

| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 259 | 166 | 158 | 171 | |
| CeTRMR_e_C2_Clutch | 148 | 135 | 388 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 842 | 4,096 | 1,550 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 2,000 | 4,096 | 4,096 | 4,096 | 1,676 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 1,725 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

**Description:** Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

**Value Units:** Pressure (kPa)
**X Unit:** Possible Output Tie-up Combination (unitless)
**Y Units:** Clutch

| y/x | CeTCLR_e_TUM_OutLockl | CeTCLR_e_TUM_OutLock2 | CeTCLR_e_TUM_OutLock3 | CeTCLR_e_TUM_OutLock4 | CeTCLR_e_TUM_OutLock5 | CeTCLR_e_TUM_OutLock6 | CeTCLR_e_TUM_OutLock7 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C2_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C3_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C4_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C5_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C6_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C7_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |

# Initial Supporting table - Illegal Drive Clutch Combinations

**Description:** All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

| y/x | CeTRMR_e_IllegalDrv_Rev1 | CeTRMR_e_IllegalDrv_Rev2 |
|---|---|---|
| CeTRMR_e_C1_Clutch | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 |

# Initial Supporting table - Illegal Park-Neutral Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Park-Neutral Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalPN_Rev | CeTRMR.e_IllegalPN.1A | CeTRMR.e.IllegalPN.I Ac | CeTRMR.e.IllegalPN.I Ad | CeTRMR.e.IllegalPN.I Af |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 2**

| y/x | CeTRMR.e.IllegalPN.I M | CeTRMR.e.IllegalPN.I Me | CeTRMR.e.IllegalPN.I Md | CeTRMR.e.IllegalPN.I Mf | CeTRMR_eJllegalPN_2A |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalPN_2M | CeTRMR_eJllegalPN_3 | CeTRMR_eJllegalPN_4 | CeTRMR_eJllegalPN_5 | CeTRMR_eJllegalPN_6 |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 4**

| y/x | CeTRMR_e_IllegalPN_7 | CeTRMR_eJllegalPN_8 | CeTRMR_eJllegalPN_9 | CeTRMR.e.IllegalPN.I 0 | |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 0 | 0 | 0 | 0 | |
| CeTRMR_e_C2_Clutch | 0 | 1 | 1 | 1 | |

## Initial Supporting table - Illegal Park-Neutral Clutch Combinations

| | | | | | |
|---|---|---|---|---|---|
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTRMR_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 0 | |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | |

# Initial Supporting table - Illegal Reverse Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Reverse Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalRev_1A | CeTRMR_e_IllegalRev_1Ac | CeTRMR_e_IllegalRev_1Ad | CeTRMR_e_IllegalRev_1Af | CeTRMR_e_IllegalRev_1M | CeTRMR_e_IllegalRev_1Me |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 0 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 0 | 0 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 2**

| y/x | CeTRMR_e_IllegalRev_1Md | CeTRMR_e_IllegalRev_1Mf | CeTRMR_e_l11egalRev_2A | CeTRMR_e_l11egalRev_2M | CeTRMR_e_IllegalRev_3 | CeTRMR_e_l11egalRev_4 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalRev_5 | CeTRMR_e_l11egalRev_6 | CeTRMR_e_IllegalRev_7 | CeTRMR_e_IllegalRev_8 | CeTRMR_e_l11egalRev_9 | CeTRMR_e_IllegalRev_10 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Direction Range Change Delay Time

**Description:** Time delay after PRNDL change before incorrect direction monitor will be enabled

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Incorrect Drive Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded drive condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Neutral Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded neutral condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Park Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded park condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Reverse Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded reverse condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1 | 4.00 | 2.00 | 1.00 | 0.80 | 0.80 |

# Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

**Description:** Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.80 | 2.40 | 1.20 | 1.20 | 1.20 |

# Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2.40 | 1.20 | 0.60 | 0.60 | 0.60 |

# Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.60 | 0.80 | 0.25 | 0.07 | 0.07 |

# Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

**Description:** Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 4.70 | 2.00 | 0.80 | 0.43 | 0.26 |

# Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

**Description:** Transition delay before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 1.20 | 0.60 | 0.20 | 0.10 | 0.08 |

# Initial Supporting table - P18AE Enable Valve Test Delay

**Description:** Time enable conditions must be met before fail timer can increment, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.50 | 0.30 | 0.16 | 0.08 | 0.08 |

# Initial Supporting table - P18AE Max Crank Time

**Description:** TestAbort Crank Time

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40 | -20 | 0 | 20 | 130 |
|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 5 | 5 |

# Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

**Description:** Line pressure that is expected to be able to overcome the PISA and force the transmission into Park,  looked up based on transmission fluid temperature

**Value Units:** kPa
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 | 2,000.00 |

# Initial Supporting table - Pump Out Available Transition Time

**Description:** Delay before pump out available flag is set TRUE, looked up based on transmission fluid temperature

**Value Units:** Seconds
**X Unit:** Deg C

| y/x | -40.00 | -20.00 | 0.00 | 20.00 | 130.00 |
|---|---|---|---|---|---|
| 1.00 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 |

# Initial Supporting table - Ratio Monitor Clutch States

**Description:** Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

**Value Units:** Clutch Held Boolean
**X Unit:** Gear
**Y Units:** Clutch

**Ratio Monitor Clutch States - Part 1**

| y/x | CeTRMR_e_GRX_GearR | CeTRMR_e_GRX_Gear1A | CeTRMR_e_GRX_Gear1Ac | CeTRMR_e_GRX_Gear1Ad | CeTRMR_e_GRX_Gear1Af |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTSER_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTSER_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTSER_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |

**Ratio Monitor Clutch States - Part 2**

| y/x | CeTRMR_e_GRX_Gear1M | CeTRMR_e_GRX_Gear1Me | CeTRMR_e_GRX_Gear1Md | CeTRMR_e_GRX_Gear1Mf | CeTRMR_e_GRX_Gear2A |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTSER_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |

**Ratio Monitor Clutch States - Part 3**

| y/x | CeTRMR_e_GRX_Gear2M | CeTRMR_e_GRX_Gear3 | CeTRMR_e_GRX_Gear4 | CeTRMR_e_GRX_Gear5 | CeTRMR_e_GRX_Gear6 |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTSER_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |

**Ratio Monitor Clutch States - Part 4**

| y/x | CeTRMR_e_GRX_Gear7 | CeTRMR_e_GRX_Gear8 | CeTRMR_e_GRX_Gear9 | CeTRMR_e_GRX_Gear10 | |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 0 | 0 | 0 | 0 | |
| CeTSER_e_C2_Clutch | 0 | 1 | 1 | 1 | |
| CeTSER_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTSER_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 0 | |

## Initial Supporting table - Ratio Monitor Clutch States

| | | | | | |
|---|---|---|---|---|---|
| CeTS ER_e_C6_CI utch | h | h | h | h | |

# Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

**Description:** Ratio Monitor Fail Increment Rate

**Value Units:** Percent Increment Per Loop
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Ratio Monitor Slip Threshold

**Description:** Threshold slip value below which the clutch is considered holding

**Value Units:** clutch slip (RPM)
**X Unit:** Clutch

| y/x | CeTRMR_e_ClchSlipC1 | CeTRMR_e_ClchSlipC2 | CeTRMR_e_ClchSlipC5 | CeTRMR_e_ClchSlipC3C4 | CeTRMR_e_ClchSlipC3C6 | CeTRMR_e_ClchSlipC4C6 |
|---|---|---|---|---|---|---|
| 1 | 30 | 30 | 30 | 25 | 25 | 25 |

# Initial Supporting table - Shift Monitor Lowest Allowed Gear

**Description:** Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

**Value Units:** Vehicle Speed (kph)
**X Unit:** Transfer Case Range
**Y Units:** Lowest Allowed Gear

| y/x | CeTCLR_e_4WD_Hi | CeTCLR_e_4WD_Lo |
|---|---|---|
| CeTGRR_e_Gear1 | 64 | 24 |
| CeTGRR_e_Gear2 | 101 | 37 |
| CeTGRR_e_Gear3 | 140 | 52 |
| CeTGRR_e_Gear4 | 170 | 63 |
| CeTGRR_e_Gear5 | 198 | 73 |
| CeTGRR_e_Gear6 | 236 | 87 |
| CeTGRR_e_Gear7 | 301 | 111 |
| CeTGRR_e_Gear8 | 352 | 131 |
| CeTGRR_e_Gear9 | 437 | 162 |
| CeTGRR_e_Gear10 | 473 | 175 |

# Initial Supporting table - wheel slip delay

| Description: | |
|---|---|
| y/x | 1 |
| 1 | -0.200 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

## Initial Supporting table - intermediate speed sensori or 2 predicted direction

**Description:** intermediate speed sensor 1 or 2 predicted direction

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionIlnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionIlnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

**Value Units:** RPM
**X Unit:** engine torque Nm

| y/x | 0.00 | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 50.0 | 100.0 | 100.0 | 150.0 | 200.0 | 250.0 | 250.0 | 250.0 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

# Initial Supporting table - C1 exhaust delay closed throttle down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay garage shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C1 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C1 exhaust delay open throttle power down shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C1 exhaust delay open throttle power on up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.500 | 1.000 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C2 exhaust delay closed throttle down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay garage shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C2 exhaust delay negative torque up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C2 exhaust delay open throttle power down shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C2 exhaust delay open throttle power on up shift

**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C3 exhaust delay closed throttle down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay garage shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C3 exhaust delay negative torque up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C3 exhaust delay open throttle power down shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C3 exhaust delay open throttle power on up shift

**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 3.000 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C4 exhaust delay closed throttle down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay garage shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C4 exhaust delay negative torque up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C4 exhaust delay open throttle power down shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C4 exhaust delay open throttle power on up shift

**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C5 exhaust delay closed throttle down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay garage shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - C5 exhaust delay negative torque up shift

**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C5 exhaust delay open throttle power down shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C5 exhaust delay open throttle power on up shift

**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay garage shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in garage shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.250 | 0.250 | 0.250 | 0.250 |

# Initial Supporting table - C6 exhaust delay negative torque up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 |

# Initial Supporting table - C6 exhaust delay open throttle power down shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 1.600 | 1.100 | 0.950 | 0.850 | 0.850 |

# Initial Supporting table - C6 exhaust delay open throttle power on up shift

**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -20.00 | 0.00 | 30.00 | 110.00 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.750 | 0.750 | 0.750 | 0.750 |

# Initial Supporting table - Clutch Clip Press GS Shifts

**Description:** Oncoming clutch clip pressure for garage shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 750 | 850 | 400 | 400 | 400 |

# Initial Supporting table - Clutch Clip Press NU Shifts

**Description:** Oncoming clutch clip pressure for negative torque up shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 450 | 450 | 600 | 450 | 450 |

# Initial Supporting table - Clutch Clip Press PD Shifts

**Description:** Oncoming clutch clip pressure for open throttle power down shifts

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 450 | 500 | 600 | 750 | 750 | 500 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

**Description:** Used for closed throttle down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

**Description:** Used for garage shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

**Description:** Used for open throttle power down shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

**Description:** Used for powered up shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

**Description:** Used for clutch staging shifts to add additional fail time based on oil temperature

**Value Units:** time (seconds)
**X Unit:** transmission fluid temperature °C

| y/x | -40 | -20 | 0 | 30 | 110 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Clutch Stuck On Shift Type Enable

**Description:** Calibration to enable the clutch stuck on test for each shift type

**XUnit:** Shift Type
**Y Units:** Boolean

| y/x | CeTSER_e_STGR | CeTSER_e_GSCR | CeTSER_e_NUCR | CeTSER_e_PUCR | CeTSER_e_CDCR | CeTSER_e_PDCR | CeTSER_e_CLAR |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

## Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

**Description:** intermediate speed sensor 1 or 2 predicted direction

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P2797 hydraulic pressure delay

**Description:** Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

**Value Units:** delay time seconds
**X Unit:** transmission fluid temperature DegC

| y/x | -40 | 0 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| 1 | 0.090 | 0.090 | 0.080 | 0.050 | 0.050 | 0.050 | 0.050 |

## Initial Supporting table - P2797 predicted turbine speed error

**Description:** Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

**Value Units:** turbine speed RPM error
**X Unit:** transmission fluid temperature DegC
**Y Units:** engine speed RPM

| y/x | -40 | 0 | 10 | 20 | 40 |
|---|---|---|---|---|---|
| 0 | 200 | 200 | 200 | 200 | 200 |
| 500 | 200 | 200 | 200 | 200 | 200 |
| 1,100 | 200 | 200 | 200 | 200 | 200 |
| 1,500 | 300 | 300 | 300 | 300 | 300 |
| 2,500 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

**Value Units:** RPM
**X Unit:** engine torque Nm

| y/x | 0.00 | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 50.0 | 100.0 | 100.0 | 150.0 | 200.0 | 250.0 | 250.0 | 250.0 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - P0741 GR10 torque converter K factor fail limit

**Description:**

**Value Units:** transmission torque converter K factor
**X Unit:** transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

| y/x | 0.000 | 0.100 | 0.200 | 0.300 | 0.500 | 0.700 | 0.800 | 0.945 | 0.950 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 400.0 | 300.0 | 225.0 | 200.0 | 200.0 | 200.0 | 250.0 | 1,000.0 | 16,383.8 |

# Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

**Value Units:** RPM
**X Unit:** engine torque Nm

| y/x | 0.00 | 64.00 | 128.00 | 192.00 | 256.00 | 320.00 | 384.00 | 448.00 | 512.00 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 50.0 | 100.0 | 100.0 | 150.0 | 200.0 | 250.0 | 250.0 | 250.0 |

# Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

**Description:** Primary Oncoming Clutch Capacity Offset from return spring pressure

**Value Units:** kPa
**X Unit:** Oncoming Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 50 | 50 | 50 | 50 | 40 | 50 |

# Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

**Description:** GR10 P2818 TCC stuck on fail time garage shift

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.250 | 0.200 | 0.125 | 0.100 | 0.100 |

# Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

**Description:** GR10 P2818 TCC stuck on fail time stall pending

**Value Units:** seconds
**X Unit:** rate of change of engine speed, RPM/second
**Y Units:** unitless

| y/x | 50 | 100 | 150 | 250 | 300 |
|---|---|---|---|---|---|
| 1 | 0.750 | 0.300 | 0.300 | 0.200 | 0.100 |

# Initial Supporting table - Clutch Connectivity C1 On Threshold

**Description:** Pressure command above which C1 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C2 On Threshold

**Description:** Pressure command above which C2 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C3 On Threshold

**Description:** Pressure command above which C3 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C4 On Threshold

**Description:** Pressure command above which C4 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C5 On Threshold

**Description:** Pressure command above which C5 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C6 On Threshold

**Description:** Pressure command above which C6 will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 175 | 175 | 175 | 175 | 175 |

# Initial Supporting table - Clutch Connectivity C7 On Threshold

**Description:** Pressure command above which SOWC will be considered commanded on

**Value Units:** Commanded Pressure (kPa)
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 300 | 300 | 300 | 300 | 300 |

# Initial Supporting table - Clutch Connectivity Wrong Direction FP

**Description:** Fault pending time for cluch connectivity detecting wrong direction

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Gain

**Description:** Gain value to convert clutch pressure command to regulator valve command

**Value Units:** Gain (unitless)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Clutch PCS Pressure Offset

**Description:** Offset value to convert clutch pressure command to regulator valve command

**Value Units:** offset (kPa)
**X Unit:** Clutch

| y/x | CeTSER_e_C1_Clutch | CeTSER_e_C2_Clutch | CeTSER_e_C3_Clutch | CeTSER_e_C4_Clutch | CeTSER_e_C5_Clutch | CeTSER_e_C6_Clutch |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 158 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 4,096 | 134 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 4,096 | 187 | 842 |
| CeTRMR_e_C4_Clutch | 313 | 313 | 313 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 82 | 82 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 158 |
| CeTRMR_e_C2_Clutch | 134 | 4,096 | 4,096 | 134 | 134 | 135 | 4,096 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 187 | 4,096 | 187 | 842 | 4,096 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 153 | 4,096 | 564 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 82 | 82 | 142 | 82 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 171 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 134 | 148 | 134 | 135 |
| CeTRMR_e_C3_Clutch | 187 | 1,550 | 187 | 4,096 | 4,096 | 4,096 | 842 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 1,676 | 4,096 | 313 | 1,676 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 153 | 564 | 4,096 | 889 | 4,096 |
| CeTRMR_e_C6_Clutch | 142 | 82 | 4,096 | 142 | 82 | 4,096 | 380 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 166 | 158 | 158 | 4,096 | 158 | 158 | 166 |
| CeTRMR_e_C2_Clutch | 134 | 134 | 134 | 134 | 4,096 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 187 | 187 | 187 | 187 | 4,096 | 187 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 313 | 313 | 313 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 153 | 153 | 153 | 153 | 564 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 82 | 82 | 82 | 142 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 158 | 158 | 4,096 | 4,096 | 158 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 135 | 134 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 842 | 187 | 4,096 | 187 | 4,096 | 187 | 1,550 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 313 | 1,676 | 4,096 | 313 | 313 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 4,096 | 153 | 4,096 | 153 | 564 | 153 | 4,096 |
| CeTRMR_e_C6_Clutch | 82 | 4,096 | 4,096 | 82 | 82 | 142 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 158 | 171 | 158 | 158 | 166 | 166 | 158 |
| CeTRMR_e_C2_Clutch | 4,096 | 134 | 148 | 134 | 135 | 134 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 842 | 187 | 187 |
| CeTRMR_e_C4_Clutch | 1,676 | 4,096 | 313 | 1,676 | 4,096 | 4,096 | 313 |
| CeTRMR_e_C5_Clutch | 153 | 564 | 4,096 | 889 | 4,096 | 153 | 153 |
| CeTRMR_e_C6_Clutch | 4,096 | 142 | 82 | 4,096 | 380 | 4,096 | 82 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 207 | 134 |
| CeTRMR_e_C3_Clutch | 187 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 313 | 313 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 153 | 4,096 | 4,096 | 564 | 564 | 4,096 | 889 |
| CeTRMR_e_C6_Clutch | 4,096 | 82 | 82 | 142 | 142 | 380 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

| Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8 | | | | | | | |
|---|---|---|---|---|---|---|---|
| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 259 | 166 | 158 | 171 | |
| CeTRMR_e_C2_Clutch | 148 | 135 | 388 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 842 | 4,096 | 1,550 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 2,000 | 4,096 | 4,096 | 4,096 | 1,676 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 1,725 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

**Value Units:** Pressure (kPa)
**X Unit:** Commanded Gear
**Y Units:** Clutch

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1**

| y/x | CeCGSR_e_NullForSched | CeCGSR_e_NeutralNoClutch | CeCGSR_e_NeutralC1 | CeCGSR_e_NeutralC2 | CeCGSR_e_NeutralC3 | CeCGSR_e_NeutralC4 | CeCGSR_e_NeutralC5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 59 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 4,096 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 4,096 | 69 | 312 |
| CeTRMR_e_C4_Clutch | 116 | 116 | 116 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 30 | 30 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2**

| y/x | CeCGSR_e_NeutralC6 | CeCGSR_e_NeutralC7 | CeCGSR_e_NeutralC1C2 | CeCGSR_e_NeutralC1C3 | CeCGSR_e_NeutralC1C4 | CeCGSR_e_NeutralC1C5 | CeCGSR_e_NeutralC2C3 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 4,096 | 4,096 | 50 | 50 | 50 | 4,096 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 69 | 4,096 | 69 | 312 | 4,096 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 116 | 4,096 | 116 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 57 | 4,096 | 209 |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 30 | 30 | 52 | 30 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3**

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| y/x | CeCGSR_e_NeutralC2C4 | CeCGSR_e_NeutralC2C5 | CeCGSR_e_NeutralC2C6 | CeCGSR_e_NeutralC3C4 | CeCGSR_e_NeutralC3C5 | CeCGSR_e_NeutralC3C6 | CeCGSR_e_NeutralC4C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 63 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 50 | 55 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 574 | 69 | 4,096 | 4,096 | 4,096 | 312 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 621 | 4,096 | 116 | 621 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 57 | 209 | 4,096 | 329 | 4,096 |
| CeTRMR_e_C6_Clutch | 52 | 30 | 4,096 | 52 | 30 | 4,096 | 141 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4**

| y/x | CeCGSR_e_NeutralC4C6 | CeCGSR_e_NeutralC1C2C3C6 | CeCGSR_e_Park_wNC | CeCGSR_e_Park_wNC1 | CeCGSR_e_Park_wNC2 | CeCGSR_e_Park_wNC3 | CeCGSR_e_Park_wNC4 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 62 | 59 | 59 | 4,096 | 59 | 59 | 62 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 50 | 50 | 4,096 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 69 | 69 | 69 | 69 | 4,096 | 69 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 116 | 116 | 116 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 57 | 57 | 57 | 57 | 209 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 30 | 30 | 30 | 52 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5**

| y/x | CeCGSR_e_Park_wNC5 | CeCGSR_e_Park_wNC6 | CeCGSR_e_Park_wNC7 | CeCGSR_e_Park_wNC1C2 | CeCGSR_e_Park_wNC2C3 | CeCGSR_e_Park_wNC2C4 | CeCGSR_e_Park_wNC2C5 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | 59 | 59 | 4,096 | 4,096 | 59 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 50 | 50 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C3_Clutch | 312 | 69 | 4,096 | 69 | 4,096 | 69 | 574 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C4_Clutch | 116 | 621 | 4,096 | 116 | 116 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 4,096 | 57 | 4,096 | 57 | 209 | 57 | 4,096 |
| CeTRMR_e_C6_Clutch | 30 | 4,096 | 4,096 | 30 | 30 | 52 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6** | | | | | | | |
| y/x | CeCGSR_e_Park_wNC2C6 | CeCGSR_e_Park_wNC3C4 | CeCGSR_e_Park_wNC3C5 | CeCGSR_e_Park_wNC3C6 | CeCGSR_e_Park_wNC4C5 | CeCGSR_e_Park_wNC4C6 | CeCGSR_e_Park_wNC1C2C3C6 |
| CeTRMR_e_C 1_Clutch | 59 | 63 | 59 | 59 | 62 | 62 | 59 |
| CeTRMR_e_C2_Clutch | 4,096 | 50 | 55 | 50 | 50 | 50 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 312 | 69 | 69 |
| CeTRMR_e_C4_Clutch | 621 | 4,096 | 116 | 621 | 4,096 | 4,096 | 116 |
| CeTRMR_e_C5_Clutch | 57 | 209 | 4,096 | 329 | 4,096 | 57 | 57 |
| CeTRMR_e_C6_Clutch | 4,096 | 52 | 30 | 4,096 | 141 | 4,096 | 30 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7** | | | | | | | |
| y/x | CeCGSR_e_Reverse | CeCGSR_e_FirstLckd | CeCGSR_e_FirstFW | CeCGSR_e_SecondLckd | CeCGSR_e_SecondFW | CeCGSR_e_Third | CeCGSR_e_Fourth |
| CeTRMR_e_C1_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C2_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 77 | 50 |
| CeTRMR_e_C3_Clutch | 69 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C4_Clutch | 4,096 | 116 | 116 | 4,096 | 4,096 | 4,096 | 4,096 |
| CeTRMR_e_C5_Clutch | 57 | 4,096 | 4,096 | 209 | 209 | 4,096 | 329 |
| CeTRMR_e_C6_Clutch | 4,096 | 30 | 30 | 52 | 52 | 141 | 4,096 |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 |

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

**Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8**

| y/x | CeCGSR_e_Fifth | CeCGSR_e_Sixth | CeCGSR_e_Seventh | CeCGSR_e_Eighth | CeCGSR_e_Ninth | CeCGSR_e_Tenth | |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C 1_Clutch | 4,096 | 4,096 | 96 | 62 | 59 | 63 | |
| CeTRMR_e_C2_Clutch | 55 | 50 | 144 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C3_Clutch | 4,096 | 312 | 4,096 | 574 | 4,096 | 4,096 | |
| CeTRMR_e_C4_Clutch | 741 | 4,096 | 4,096 | 4,096 | 621 | 4,096 | |
| CeTRMR_e_C5_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 639 | |
| CeTRMR_e_C6_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |
| CeTRMR_e_C7_Clutch | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | 4,096 | |

# Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

**Description:** Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

**Value Units:** Pressure (kPa)
**X Unit:** Possible Output Tie-up Combination (unitless)
**Y Units:** Clutch

| y/x | CeTCLR_e_TUM_OutLockl | CeTCLR_e_TUM_OutLock2 | CeTCLR_e_TUM_OutLock3 | CeTCLR_e_TUM_OutLock4 | CeTCLR_e_TUM_OutLock5 | CeTCLR_e_TUM_OutLock6 | CeTCLR_e_TUM_OutLock7 |
|---|---|---|---|---|---|---|---|
| CeTRMR_e_C1_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C2_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C3_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C4_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C5_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C6_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |
| CeTRMR_e_C7_Clutch | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 | -4,096 |

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"

**Value Units:** seconds
**X Unit:** transmission fluid temperature °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 40.00 |
|---|---|---|---|---|---|
| 1 | 0.650 | 0.650 | 0.650 | 0.500 | 0.500 |

# Initial Supporting table - Illegal Drive Clutch Combinations

**Description:** All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

| y/x | CeTRMR_e_IllegalDrv_Rev1 | CeTRMR_e_IllegalDrv_Rev2 |
|---|---|---|
| CeTRMR_e_C1_Clutch | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 |

# Initial Supporting table - Illegal Park-Neutral Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Park-Neutral Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalPN_Rev | CeTRMR.e_IllegalPN.1A | CeTRMR.e.IllegalPN.I Ac | CeTRMR.e.IllegalPN.I Ad | CeTRMR.e.IllegalPN.I Af |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 2**

| y/x | CeTRMR.e.IllegalPN.I M | CeTRMR.e.IllegalPN.I Me | CeTRMR.e.IllegalPN.I Md | CeTRMR.e.IllegalPN.I Mf | CeTRMR_eJllegalPN_2A |
|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalPN_2M | CeTRMR_eJllegalPN_3 | CeTRMR_eJllegalPN_4 | CeTRMR_eJllegalPN_5 | CeTRMR_eJllegalPN_6 |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 |

**Illegal Park-Neutral Clutch Combinations - Part 4**

| y/x | CeTRMR_e_IllegalPN_7 | CeTRMR_eJllegalPN_8 | CeTRMR_eJllegalPN_9 | CeTRMR.e.IllegalPN.I 0 | |
|---|---|---|---|---|---|
| CeTRMR.e.CI .Clutch | 0 | 0 | 0 | 0 | |
| CeTRMR_e_C2_Clutch | 0 | 1 | 1 | 1 | |

## Initial Supporting table - Illegal Park-Neutral Clutch Combinations

| | | | | | |
|---|---|---|---|---|---|
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTRMR_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 0 | |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | |

# Initial Supporting table - Illegal Reverse Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

**Value Units:** Boolean (1 for on, 0 for off)
**X Unit:** Illegal Clutch Combination
**Y Units:** Clutch

**Illegal Reverse Clutch Combinations - Part 1**

| y/x | CeTRMR_e_IllegalRev_1A | CeTRMR_e_IllegalRev_1Ac | CeTRMR_e_IllegalRev_1Ad | CeTRMR_e_IllegalRev_1Af | CeTRMR_e_IllegalRev_1M | CeTRMR_e_IllegalRev_1Me |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 0 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 0 | 1 | 0 | 0 | 0 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 2**

| y/x | CeTRMR_e_IllegalRev_1Md | CeTRMR_e_IllegalRev_1Mf | CeTRMR_e_l11egalRev_2A | CeTRMR_e_l11egalRev_2M | CeTRMR_e_IllegalRev_3 | CeTRMR_e_l11egalRev_4 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C2_Clutch | 1 | 1 | 0 | 1 | 0 | 0 |
| CeTRMR_e_C3_Clutch | 0 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 1 | 0 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 0 | 0 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 0 | 1 | 0 | 0 | 0 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

**Illegal Reverse Clutch Combinations - Part 3**

| y/x | CeTRMR_e_IllegalRev_5 | CeTRMR_e_l11egalRev_6 | CeTRMR_e_IllegalRev_7 | CeTRMR_e_IllegalRev_8 | CeTRMR_e_l11egalRev_9 | CeTRMR_e_IllegalRev_10 |
|---|---|---|---|---|---|---|
| CeTRMR_e_C1.Clutch | 1 | 1 | 0 | 0 | 0 | 0 |
| CeTRMR_e_C2_Clutch | 0 | 0 | 0 | 1 | 1 | 1 |
| CeTRMR_e_C3_Clutch | 1 | 0 | 1 | 0 | 1 | 1 |
| CeTRMR_e_C4_Clutch | 0 | 1 | 1 | 1 | 0 | 1 |
| CeTRMR_e_C5_Clutch | 1 | 1 | 1 | 1 | 1 | 0 |
| CeTRMR_e_C6_Clutch | 1 | 1 | 1 | 1 | 1 | 1 |
| CeTRMR_e_C7_Clutch | 0 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Direction Range Change Delay Time

**Description:** Time delay after PRNDL change before incorrect direction monitor will be enabled

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 |

# Initial Supporting table - Incorrect Drive Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded drive condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Neutral Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded neutral condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Park Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded park condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Incorrect Reverse Fail Time

**Description:** Fail Time as a function of temperature for incorrectly commanded reverse condition

**Value Units:** time (sec)
**X Unit:** transmission oil temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

## Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

**Description:** intermediate speed sensor 1 or 2 predicted direction

**Value Units:** predicted direction: forward, reverse, unknown
**X Unit:** attained gear
**Y Units:** intermediate speed sensor 1 or 2

| intermediate speed sensor 1 or 2 predicted direction - Part 1 | | | |
|---|---|---|---|
| y/x | CeCGSR_e_CR_NullForSched | CeCGSR_e_CR_Neutral | CeCGSR_e_CR_Park |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 2** | | | |
| y/x | CeCGSR_e_CR_Reverse | CeCGSR_e_CR_First | CeCGSR_e_CR_Second |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| **intermediate speed sensor 1 or 2 predicted direction - Part 3** | | | |
| y/x | CeCGSR_e_CR_Third | CeCGSR_e_CR_Fourth | CeCGSR_e_CR_Fifth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionUnknown |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 4** | | | |
| y/x | CeCGSR_e_CR_Sixth | CeCGSR_e_CR_Seventh | CeCGSR_e_CR_Eighth |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionUnknown | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward |
| **intermediate speed sensor 1 or 2 predicted direction - Part 5** | | | |
| y/x | CeCGSR_e_CR_Ninth | CeCGSR_e_CR_Tenth | |
| CeTSRR_e_C2C_ClchSpdSnsr1 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |
| CeTSRR_e_C2C_ClchSpdSnsr2 | CeTNSR_e_DirectionForward | CeTNSR_e_DirectionForward | |

## Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** intermediate speed sensor select
**Y Units:** commanded gear

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P176B intermediate speed sensor fail time threshold

**Description:** P176B intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192.0 | 192.0 |

# Initial Supporting table - P176B ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P176B ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

**Description:** P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

**Value Units:** intermediate speed sensor RPM
**X Unit:** intermediate speed sensor 1 or 2

| y/x | CeTNSR_e_InternalSpdSnsr1 | CeTNSR_e_InternalSpdSnsr2 | CeTNSR_e_InternalSpdSnsr3 |
|---|---|---|---|
| 1 | 350 | 225 | 10 |

## Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Description:** delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 0.500 | 0.500 |

# Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

**Value Units:** TRUE or FALSE
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| CeCGSR_e_CR_NullForSched | 1 | 1 |
| CeCGSR_e_CR_Neutral | 1 | 1 |
| CeCGSR_e_CR_Park | 1 | 1 |
| CeCGSR_e_CR_Reverse | 1 | 1 |
| CeCGSR_e_CR_First | 1 | 1 |
| CeCGSR_e_CR_Second | 1 | 1 |
| CeCGSR_e_CR_Third | 1 | 0 |
| CeCGSR_e_CR_Fourth | 1 | 0 |
| CeCGSR_e_CR_Fifth | 1 | 0 |
| CeCGSR_e_CR_Sixth | 1 | 0 |
| CeCGSR_e_CR_Seventh | 0 | 0 |
| CeCGSR_e_CR_Eighth | 0 | 0 |
| CeCGSR_e_CR_Ninth | 0 | 0 |
| CeCGSR_e_CR_Tenth | 0 | 0 |

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

**Description:** P176B intermediate speed sensor fail count threshold

**Value Units:** fail counts
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 3 | 3 |

# Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

**Value Units:** RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 100 | 100 |

# Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

**Value Units:** seconds
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.500 | 1.500 |

# Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

**Value Units:** estimated transmission intermediate speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

**Value Units:** transmission input speed RPM
**X Unit:** intermediate speed sensor select

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 192 | 192 |

# Initial Supporting table - P17D6 ratio calibration when not REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

**Value Units:** ratio
**X Unit:** commanded gear
**Y Units:** intermediate speed sensor select

| y/x | CeTGRR_e_Gear1 | CeTGRR_e_Gear2 | CeTGRR_e_Gear3 | CeTGRR_e_Gear4 | CeTGRR_e_Gear5 | CeTGRR_e_Gear6 | CeTGRR_e_Gear7 | CeTGRR_e_Gear8 | CeTGRR_e_Gear9 | CeTGRR_e_Gear10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CeTSRR_e_C2C_ClchSpdSnsr1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.5596 | 0.4342 | 0.4342 |
| CeTSRR_e_C2C_ClchSpdSnsr2 | 1.0000 | 1.0000 | 3.1250 | 1.7699 | 1.7699 | 1.3774 | 1.0000 | 0.8224 | 0.6382 | 0.6382 |

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

**Value Units:** ratio

| y/x | CeTSRR_e_C2C_ClchSpdSnsr1 | CeTSRR_e_C2C_ClchSpdSnsr2 |
|---|---|---|
| 1 | 1.0000 | 1.0000 |

# Initial Supporting table - Ratio Monitor Clutch States

**Description:** Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

**Value Units:** Clutch Held Boolean
**X Unit:** Gear
**Y Units:** Clutch

**Ratio Monitor Clutch States - Part 1**

| y/x | CeTRMR_e_GRX_GearR | CeTRMR_e_GRX_Gear1A | CeTRMR_e_GRX_Gear1Ac | CeTRMR_e_GRX_Gear1Ad | CeTRMR_e_GRX_Gear1Af |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 0 | 0 | 1 | 0 | 0 |
| CeTSER_e_C4_Clutch | 1 | 0 | 0 | 1 | 0 |
| CeTSER_e_C5_Clutch | 0 | 1 | 1 | 1 | 1 |
| CeTSER_e_C6_Clutch | 1 | 0 | 0 | 0 | 1 |

**Ratio Monitor Clutch States - Part 2**

| y/x | CeTRMR_e_GRX_Gear1M | CeTRMR_e_GRX_Gear1Me | CeTRMR_e_GRX_Gear1Md | CeTRMR_e_GRX_Gear1Mf | CeTRMR_e_GRX_Gear2A |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C3_Clutch | 0 | 1 | 0 | 0 | 1 |
| CeTSER_e_C4_Clutch | 0 | 0 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C6_Clutch | 0 | 0 | 0 | 1 | 0 |

**Ratio Monitor Clutch States - Part 3**

| y/x | CeTRMR_e_GRX_Gear2M | CeTRMR_e_GRX_Gear3 | CeTRMR_e_GRX_Gear4 | CeTRMR_e_GRX_Gear5 | CeTRMR_e_GRX_Gear6 |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 1 | 1 | 1 | 1 | 1 |
| CeTSER_e_C2_Clutch | 1 | 0 | 0 | 0 | 0 |
| CeTSER_e_C3_Clutch | 1 | 1 | 1 | 1 | 0 |
| CeTSER_e_C4_Clutch | 1 | 1 | 1 | 0 | 1 |
| CeTSER_e_C5_Clutch | 0 | 1 | 0 | 1 | 1 |
| CeTSER_e_C6_Clutch | 0 | 0 | 1 | 1 | 1 |

**Ratio Monitor Clutch States - Part 4**

| y/x | CeTRMR_e_GRX_Gear7 | CeTRMR_e_GRX_Gear8 | CeTRMR_e_GRX_Gear9 | CeTRMR_e_GRX_Gear10 | |
|---|---|---|---|---|---|
| CeTSER_e_C1_Clutch | 0 | 0 | 0 | 0 | |
| CeTSER_e_C2_Clutch | 0 | 1 | 1 | 1 | |
| CeTSER_e_C3_Clutch | 1 | 0 | 1 | 1 | |
| CeTSER_e_C4_Clutch | 1 | 1 | 0 | 1 | |
| CeTSER_e_C5_Clutch | 1 | 1 | 1 | 0 | |

## Initial Supporting table - Ratio Monitor Clutch States

| | | | | | |
|---|---|---|---|---|---|
| CeTS ER_e_C6_CI utch | h | h | h | h | |

# Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

**Description:** Ratio Monitor Fail Increment Rate

**Value Units:** Percent Increment Per Loop
**X Unit:** Transmission Oil Temperature (deg C)

| y/x | -40 | -20 | 0 | 20 | 120 |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |

# Initial Supporting table - Ratio Monitor Slip Threshold

**Description:** Threshold slip value below which the clutch is considered holding

**Value Units:** clutch slip (RPM)
**X Unit:** Clutch

| y/x | CeTRMR_e_ClchSlipC1 | CeTRMR_e_ClchSlipC2 | CeTRMR_e_ClchSlipC5 | CeTRMR_e_ClchSlipC3C4 | CeTRMR_e_ClchSlipC3C6 | CeTRMR_e_ClchSlipC4C6 |
|---|---|---|---|---|---|---|
| 1 | 30 | 30 | 30 | 25 | 25 | 25 |

# Initial Supporting table - Shift Monitor Lowest Allowed Gear

**Description:** Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

**Value Units:** Vehicle Speed (kph)
**X Unit:** Transfer Case Range
**Y Units:** Lowest Allowed Gear

| y/x | CeTCLR_e_4WD_Hi | CeTCLR_e_4WD_Lo |
|---|---|---|
| CeTGRR_e_Gear1 | 64 | 24 |
| CeTGRR_e_Gear2 | 101 | 37 |
| CeTGRR_e_Gear3 | 140 | 52 |
| CeTGRR_e_Gear4 | 170 | 63 |
| CeTGRR_e_Gear5 | 198 | 73 |
| CeTGRR_e_Gear6 | 236 | 87 |
| CeTGRR_e_Gear7 | 301 | 111 |
| CeTGRR_e_Gear8 | 352 | 131 |
| CeTGRR_e_Gear9 | 437 | 162 |
| CeTGRR_e_Gear10 | 473 | 175 |

# Initial Supporting table - speed sensor directional rationality enable calibration

**Description:** speed sensor directional rationality enable calibration

**Value Units:** Boolean
**X Unit:** scheduled gear
**Y Units:** unitless

| y/x | CeCGSR_FwdCmded | CeCGSR-NeutCmded | CeCGSR_RvrsCmded | CeCGSR-ParkCmded |
|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 1 |

# Initial Supporting table - transmission fluid temperature warm up time

**Description:**

**Value Units:** transmission fluid temperature normal warn up time, seconds
**X Unit:** transmission fluid temperature at controller power up, °C

| y/x | -40.00 | -30.00 | -20.00 | 0.00 | 20.00 |
|---|---|---|---|---|---|
| 1 | 1,800.0 | 1,500.0 | 1,200.0 | 600.0 | 60.0 |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Cell/Global Positioning System Combined Antenna Coaxial Signal | B13AA | Short to Battery<br><br>The emissions neutral default action for all diagnotics under DTC B13AA is to disable adaptive cruise control and/or Super Cruise | The purpose of this DTC is to detect short to positive of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are under the open/short threshold defined in DID and ANT_PT_SENSE values is high. | Short to Battery Threshold = 1.53 - 2.35 V | Diagnoic Calibration Enabled | Vehicle Power Mode condition: ACCESSORY, RUN<br>Algorithm will be started just after TCP is getting to OnStar on mode. | After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second.<br>MDM checks GPS(secondary) antenna state with these values. | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Short to Ground | The purpose of this DTC is to detect short to ground of GPS(secondary) antenna circuit. Short to Ground DTC is set when the GPS(secondary) Antenna ADC value is under the open/short threshold defined in DID and | ANT_PT_SENSE(GPIO) is low state - GPS Antenna Short to Ground DTC Voltage Lower Value Threshold = 0.05V | Diagnoic Calibration Enabled | Vehicle Power Mode condition: ACCESSORY, RUN<br>Algorithm will be started just after TCP is getting to OnStar on mode. | After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second.<br>MDM checks GPS(secondary) antenna state with these values. | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Open Circuit | The purpose of this DTC is to detect open of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are between open/short threshold and connect/open threshold defined in DID. | GPS Antenna Open DTC Voltage Upper Value Threshold = 0.2V | Diagnoic Calibration Enabled | Vehicle Power Mode condition: ACCESSORY, RUN<br>Algorithm will be started just after TCP is getting to OnStar on mode. | After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second.<br>MDM checks GPS(secondary) antenna state with these values. | Safety Non-MIL Emissions Neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Lost Communication with External Object Calculating Module/EOCM_HCP1 on CAN Bus 2 | U1615 | Upon notification by the handler that the associated supervised signal has failed supervision (typically 2.5 times the nominal periodic rate of the monitored signal.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Signals not detected for 2.5 times the sampling rate | Fault Detected | Test Results shall not be considered valid if any of the following are true:<br>• U161500.ENABLE = disabled • within the first 5 seconds of<br>o a power-up reset<br>o a running reset<br>o a recovery from an under voltage condition or a recovery from an over voltage condition.<br>• When a bus off condition (U007X) is current, the Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met.<br>•Transport models active3 | • Vehicle Supply voltage is within a calibratable rangel (k_Battery Voltage Low Threshold and k_Battery Voltage High Threshold).<br>• Monitored PDUs/Signals are specified as part of the active partial network(s).<br>• Any PN that the monitored PDU/Signal is mapped to has been active for 5 seconds or longer. This timer only resets when the Signal/PDU becomes inactive due to PN(s) deactivation(s). | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| Invalid Data Received from External Object Calculating Module 1 | U053B | Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the External Object Calculation Module 1<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Key Table Not Provisioned | U1960 | The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | The Authoritative Counter<br><br>Any single Key Slot Provision State Flag for Key 2 through to the final Key<br>AND<br>OBD Manufacturing Enable Counter<br><br>ERC_KEY_EMPTY | = Max Value<br><br>= 0<br><br>= 0<br><br>= TRUE | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196000_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>All of the previous conditions plus anyone of the following:<br><br>1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU power up.<br>3) Monitored whileRID 0x0200; Provision Security Peripheral General Keys is being executed | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received. | Safety Non-MIL Emission neutral Diagnostic |
| Security Peripheral Performance - Performance or Incorrect Operation | U1961 | The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br><br>2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196192_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Unable To Authenticate Serial Data Message | U1962 | Monitors incoming message authentification code and compares with the expected based on message source.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.<br><br>It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot<br><br>number of consecutive failures failures | ><br>k_ERRH_C_FailedAuthenticationCounter | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_Seri alDataAuthe ntificat ionPowerModeTime<br><br>Fault Code U196192<br><br>U196200—ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 2 seconds<br><br>= Inactive<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Module Low Content Internal/Programming failures | U3000 | Control Module General Checksum Failure.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000. | The purpose of this DTC is to detect checksum failure of NAND Flash File System.<br>DTC is set only when partition mount failed at boot up time. And during run-time, file monitor daemon (It's name is "cfm-daemon") will request system reboot when detect error then system has a chance to repair the problem file system (try fix up or try format) at boot up time, if system couldn't recover file system and fail to mount it then DTC will be set. | = Fault Detected | Exceptions: Algorithm shall not run if; Diagnostic Calibration E = disabled | Vehicle Power Mode condition: ACCESSORY, RUN<br>'DTC is set when file system not mounted. | Power On Diagnostics | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Data Memory Failure | General Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>U300042_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Program Memory Failure | Program Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>Dignostic_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Calibration / Parameter Memory Failure | TCP has not been calibrated/configured or calibration process failed indicated by:<br><br>k_default_calibration | <br><br><br>= True | Vehicle Supply Voltage<br><br>U300054_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br><br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Watchdog and Safety Microcontroller Failure | The purpose of DTC is to detect watchdog happened in previous cycle. It just only show watch dog was happened. | DTC is set when register value is same to written value in the previous cycle. | Exceptions: Algorithm shall not run if; Diagnostic Calibration disabled | Vehicle Power Mode condition: RUN | Running Diagnostics | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Control Module Internal Electronic Failure | Internal circuit failure is detected | Fault Detected | Diagnostic_ENABLE = Enabled. | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously and at Startup. | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Not Configured | Sensor operating software not sucessfully flashed on to the microcontroller | = Fault detected | Vehicle Supply Voltage<br><br>Calibration_ENABLE<br><br>OBD Manufacturing Enable Counter<br><br>Power Mode = Run<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>ECU_COMM_Active<br><br>Any Partial Network that the ECU participates in is active | 9V < voltage < 16V<br><br>= Enabled<br><br>= 0<br><br>> 5 seconds<br><br>> 5 seconds<br><br><br>= True | Checked every 0.01000 seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Component Internal Failure | Internal circuit failure is detected | Fault Detected | Diagnostic_ENABLE = Enabled. | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously and at Startup. | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Left Front Camera Temperature Above Threshold | B0205 | Temperature of imager is above threshold<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data The default action depends on the downstream consumer. | Camera internal temperature above threshold. | 105C | Diagnostic Calibration Enabled | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN<br>ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Right Front Camera Temperature Above Threshold | B0206 | Temperature of imager is above threshold<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Camera internal temperature above threshold. | 105C | Diagnostic Calibration Enabled | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN<br>ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Rear Vision Camera Low Voltage Differential Signaling LVDS Coaxial Signal | B1594 | Circuit Short To Ground on LVSD signal between from VPM module and remote camera.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Short to ground is detected | Fault Detected | LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds<br>Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition<br>Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Circuit Open on LVSD signal between from VPM module and remote camera | Open circuit failure is detected | Fault Detected | LVDS Coaxial Signal Circuit Open DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds<br>Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition<br>Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Signal Invalid - The signal from the camera to the VPM is invalid | This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw. | Fault Detected | K_Rear_Camera_Failure_SignalJnvalid_Diagnostic_Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data | ARC/Sequency Number not updated | Fault Detected | Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Front Vision Camera Low Voltage Differential Signaling LVDS Coaxial Signal | B1595 | Circuit Short To Ground on LVSD signal between from VPM module and remote camera<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Short to ground is detected | Fault Detected | LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds<br>Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition<br>Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Circuit Open on LVSD signal between from VPM module and remote camera | Open circuit failure is detected | Fault Detected | LVDS Coaxial Signal Circuit Open DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds<br>Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition<br>Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Signal Invalid - The signal from the camera to the VPM is invalid | This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw. | Fault Detected | K_Front_Camera_Failure_Signal_Invalid_Diagnostic_Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data | ARC/Sequency Number not updated | Fault Detected | Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| Right Side Curb Camera Low Voltage Differential Signaling LVDS Coaxial Signal | B1597 | Circuit Short To Ground on LVSD signal between from VPM module and remote camera<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Short to ground is detected | Fault Detected | LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds<br>Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition<br>Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Circuit Open on LVSD signal between from VPM module and remote camera | Open circuit failure is detected | Fault Detected | LVDS Coaxial Signal Circuit Open DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Signal Invalid - The signal from the camera to the VPM is invalid | This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw. | Fault Detected | K_RightSideCurb_Camera_Failure_Signal_Invalid Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data | ARC/Sequency Number not updated | Fault Detected | Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| Left Side Curb Camera Low Voltage Differential Signaling LVDS Coaxial Signal | B1598 | Circuit Short To Ground on LVSD signal between from VPM module and remote camera<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Short to ground is detected | Fault Detected | LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Circuit Open on LVSD signal between from VPM module and remote camera | Open circuit failure is detected | Fault Detected | LVDS Coaxial Signal Circuit Open DTC Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Signal Invalid - The signal from the camera to the VPM is invalid | This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw. | Fault Detected | K_LeftSideCurb_Camera_Failure_Signal_Invalid_Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data | ARC/Sequency Number not updated | Fault Detected | Diagnostic Enable = TRUE | Vehicle Power Mode = ACCY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| Rear Camera | B1A62 | Missing Calibration<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | This sub-function shall set Rear Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed. | Fault Detected | K_Rear_Camera_Failure_Calibration_Not_Learned Diagnostic Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Wrong Mounting Position | This sub-function shall set Rear Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position. | Fault Detected | K_Rear_Camera_Failure_Wrong_Mounting_Location Diagnostic Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Performance or Incorrect Operation | This sub-function shall set Rear Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed. | Fault Detected | K_Rear_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Component or System Over Temperature | Camera internal temperature above threshold. | 105C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Rear Vision Camera Temperature Below Threshold | Camera internal temperature below threshold | -30C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Front Camera | B1A68 | Missing Calibration<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | This sub-function shall set Front Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed. | Fault Detected | K_Front_Camera_Failure_Calibration_Not_Learned Diagnostic Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Wrong Mounting Position | This sub-function shall set Front Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position. | Fault Detected | K_Front_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Performance or Incorrect Operation | This sub-function shall set Front Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed. | Fault Detected | K_Front_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Component or System Over Temperature | Camera internal temperature above threshold. | 105C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Front Vision Camera Temperature Below Threshold | Camera internal temperature below threshold | -30C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Side Vision Camera - Left | B1A69 | Missing Calibration<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | This sub-function shall set Side Left Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed. | Fault Detected | K_SideLeft_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Wrong Mounting Position | This sub-function shall set Side Left Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position. | Fault Detected | K_SideLeft_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Performance or Incorrect Operation | This sub-function shall set Side Left Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed. | Fault Detected | K_SideLeft_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Component or System Over Temperature | Camera internal temperature above threshold. | 105C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Side Left Vision Camera Temperature Below Threshold | Camera internal temperature below threshold | -30C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Side Vision Camera - Right | B1A6A | Missing Calibration<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | This sub-function shall set Side Right Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed. | Fault Detected | K_SideRight_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Wrong Mounting Position | This sub-function shall set Side Right Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position. | Fault Detected | K_SideRight_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Performance or Incorrect Operation | This sub-function shall set Side Right Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed. | Fault Detected | K_SideRight_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE | Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Component or System Over Temperature | Camera internal temperature above threshold. | 105C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Side Right Vision Camera Temperature Below Threshold | Camera internal temperature below threshold | -30C | Diagnostic = Enabled. | Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Lost Communication with External Object Calculating Module/EOCM_HCP1 on CAN Bus 1 | U1614 | Upon notification by the handler that the associated supervised signal has failed supervision (typically 2.5 times the nominal periodic rate of the monitored signal.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | Signals not detected for 2.5 times the sampling rate | Fault Detected | Test Results shall not be considered valid if any of the following are true:<br>• U161400_ENABLE = disabled • within the first 5 seconds of<br>o a power-up reset<br>o a running reset<br>o a recovery from an under voltage condition or a recovery from an over voltage condition.<br>• When a bus off condition (U007X) is current, the Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met.<br>• Transport mode is active3 | • Vehicle Supply voltage is within a calibratable rangel (k_Battery Voltage Low Threshold and k_Battery Voltage High Threshold).<br>• Monitored PDUs/Signals are specified as part of the active partial network(s).<br>• Any PN that the monitored PDU/Signal is mapped to has been active for 5 seconds or longer. This timer only resets when the Signal/PDU becomes inactive due to PN(s) deactivation(s). | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Invalid Data Received from External Object Calculating Module 1 | U053B | Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period<br><br>HstVehPathParms_Prtctd_MSG | = 0.02500 seconds (timeout) | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= True<br><br>> 5 seconds<br><br>= 0 | Dependent upon receipt of each monitored signal from the External Object Calculation Module 1<br><br>Fault maturation time is 0.02500 seconds | Safety Non-MIL Emission neutral Diagnostic |
| Key Table Not Provisioned | U1960 | The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | The Authoritative Counter<br><br>Any single Key Slot Provision State Flag for Key 2 through to the final Key<br>AND<br>OBD Manufacturing Enable Counter<br><br>ERC_KEY_EMPTY | = Max Value<br><br>= 0<br><br>= 0<br><br>= TRUE | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196000_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event<br><br>All of the previous conditions plus anyone of the following:<br><br>1) Monitored continuously while CAN frames are being transmitted and received.<br>2) Checked at ECU power up.<br>3) Monitored whileRID 0x0200; Provision Security Peripheral General Keys is being avnni ifoH | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received. | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| Security Peripheral Performance - Performance or Incorrect Operation | U1961 | The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. | 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).<br><br>2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). | = Fault Detected | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SecurityPeripheralPerformanceDiagnosticPowerModeTime<br><br>U196192_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 5 seconds<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Unable To Authenticate Serial Data Message | U1962 | Monitors incoming message authentification code and compares with the expected based on message source.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.<br><br>It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices. | A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot<br><br>number of consecutive failures failures | ><br>k_ERRH_C_FailedAuthenticationCounter | Vehicle Supply Voltage<br><br>PNC_ActiveTxPDUEnable<br>AND<br>k_SerialDataAuthenticationPowerModeTime<br><br>Fault CodeU196192<br><br>U196200_ENABLE<br><br>Transport Mode<br><br>Time since power up reset or running reset or under voltage or over voltage condition event | 9V < voltage < 16V<br><br>= True<br><br>>= 2 seconds<br><br>= Inactive<br><br>= Enabled<br><br>= Inactive<br><br>> 5 seconds | Monitored continuously while CAN frames are being transmitted and received | Safety Non-MIL Emission neutral Diagnostic |
| Module Low Content Internal/Programming failures | U3000 | Control Module General Checksum Failure.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000. | Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected. | = Fault Detected | Vehicle Supply Voltage<br><br>U300041_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Data Memory Failure | General Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>U300042_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Control Module Program Memory Failure | Program Memory Failure Detected | = Fault Detected | Vehicle Supply Voltage<br><br>Dignostic_ENABLE | 9V < voltage < 16V<br><br>= Enabled | Continuously | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Internal Electronic Failure | VPM internal circuit failure is detected | Fault Detected | Diagnostic_ENABLE = Enabled. | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously and at Startup. | Safety Non-MIL Emission neutral Diagnostic |
| | | Control Module Over Temperature | VPM internal temperature above threshold | 75C | Diagnostic_ENABLE = Enabled | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| | | Control Module Component or System Under Temperature | VPM internal temperature blow threshold | -40C | Diagnostic_ENABLE = Enabled | Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v | Continuously | Safety Non-MIL Emissions Neutral Diagnostic |
| Vehicle Identification Number - Not Programmed or Incompatible | U3002 | Diagnostic detects VIN not programmed | This diagnostic shall fail if VIN stored in EEPROM contains all bytes such that:<br><br>VIN EEPROM | = OxFF | Vehicle Supply Voltage<br><br>Vehicle Power Mode<br><br>U300251_ENABLE<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= Run<br><br>= Enabled<br><br>= 0 | Startup | |
| | | This diagnostic detects a VIN mismatch | Any digit of the programmed VIN does not match the digits of the VIN transmitted over the GMLAN. In addition, the VIN numbers programmed in EEPROM are NOT all OxFF'ssuch that:<br><br>VIN Stored<br>AND<br>VIN Stored | Does not equal VIN transmitted over GMLAN<br><br>Does not equal to OxFF | Vehicle Supply Voltage<br><br>Vehicle Power Mode<br><br>U300256_ENABLE<br><br>OBD Manufacturer Enable Counter | 9V < voltage < 16V<br><br>= Run<br><br>= Enabled<br><br>= 0 | Startup | Safety Non-MIL Emission neutral Diagnostic |
| Battery Supply Voltage | U3003 | Battery Voltage - Circuit Voltage Below Threshold.<br><br>Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003. | Front Camera Module Low Content (FCM_LC) supply voltage (Vsup) | < 9.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300316_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |

| Component/System | Fault Code | Monitor Strategy Description | Malfunction Criteria | Threshold Value | Secondary Parameters | Enable Conditions | Time Required | MIL Ilium. |
|---|---|---|---|---|---|---|---|---|
| | | Battery Voltage - Circuit Voltage Above Threshold | Front Camera Module Low Content (FCM_LC) supply voltage (Vsup) | > 16.0 +/-0.5 volts | Vehicle Power Mode = Run<br><br>Virtual Network Condition: Any Partial Network that the ECU participates in is active.<br><br>U300317_ENABLE | > 5 seconds<br><br>= Enabled | 3.000 Seconds | Safety Non-MIL Emission neutral Diagnostic |