

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Door Open Switch Signal - Door Ajar Switch Signal Not Plausible	B2A00	Compares the Door Ajar and Door Open Switch for mismatch	Door Open Switch  AND Door Ajar switch	=OPEN  = CLOSED	Ignition      Not Fault Active  The enabling cal must be =3 to enable a type C DTC:	= Run/Crank  OR  = Accessory    U0422   3.00	240 failure out of 240 samples 12.5 ms loop	Emissio ns Neutral Diagnost ics – Type C, No MIL

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Blower Motor Speed Return Circuit High	B2B02	<p>This DTC will detect when the blower motor feedback hardwire circuit signal is too out of range high. This includes some non-OBD failures in the blower system, open, and short to 12 V.</p> <p>Blower Motor Speed Return Circuit High Diagnostic will consume the Climate Control Front Blower Fan Speed Feedback Wire Duty Cycle High Fault Status from the OBD Smart Device "BCM" and increment the failure counter when a fail occurs. X of Y will determine fault maturation and when to set the DTC.</p>	Duty Cycle	Climate Control Front Blower Fan Speed Feedback Out of Range High Fault Status = "FAIL"	No active DTC's:	<p>High Speed CAN enabled</p> <p>U0140 Loss of Comm BCM FA Not Set</p> <p>B2B38 Message Counter Incorrect FA not Set</p>	<p>8 failures out of 10 samples</p> <p>1 sample per second</p>	Type C, No SVS "Emissions Neutral Diagnostics – Type C"



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Blower Motor Speed Return Circuit Low	B2B03	<p>This DTC will detect when the blower motor feedback hardware circuit signal is out of range low. This includes some internal blower failures and short to ground conditions.</p> <p>Blower Motor Speed Return Circuit Low Diagnostic will consume the Climate Control Front Blower Fan Speed Feedback Wire Duty Cycle Low Fault Status from OBD Smart Device "BCM" and increment the failure counter when a fail occurs. X of Y will determine fault maturation and when to set the DTC.</p>	Duty Cycle	Climate Control Front Blower Fan Speed Feedback Out of Range Low Fault Status = "FAIL"	No active DTC's:	<p>High Speed CAN enabled</p> <p>U0140 Loss of Comm BCM FA Not Set</p> <p>B2B38 Message Counter Incorrect FA not Set</p>	<p>8 failures out of 10 samples</p> <p>1 sample per second</p>	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Blower Motor Speed Return Feedback Circuit Out of Range High	B2B0B	<p>This DTC will detect when the blower motor feedback sensor is reporting a value above the maximum allowed.</p> <p>Blower Motor Speed Feedback Circuit Out of Range High Diagnostic will consume the Climate Control Front Blower Fan Speed Feedback Frequency from the OBD Smart Device "BCM" and increment the failure counter when a fail occurs. X of Y will determine fault maturation and when to set the DTC.</p>	DC frequency	> 190 Hertz	No active DTC's:	<p>High Speed CAN enabled</p> <p>U0140 Loss of Comm BCM FA Not Set</p> <p>B2B38 Message Counter Incorrect FA not Set</p> <p>B2B02 FA Not Set</p> <p>B2B03 FA Not Set</p>	<p>8 failures out of 10 samples</p> <p>1 Sec / Sample</p>	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Blower Motor Speed Return Feedback Circuit Out of Range Low	B2B0C	<p>This DTC will detect when the blower motor feedback sensor is reporting a value less than the minimum allowed.</p> <p>Blower Motor Speed Feedback Circuit Out of Range Low Diagnostic will consume the Climate Control Front Blower Fan Speed Feedback Frequency from the OBD Smart Device "BCM" and increment the failure counter when a fail occurs. X of Y will determine fault maturation and when to set the DTC.</p>	DC frequency	< 45 Hertz	No active DTC's:	<p>High Speed CAN enabled</p> <p>U0140 Loss of Comm BCM FA Not Set</p> <p>B2B38 Message Counter Incorrect FA not Set</p> <p>B2B02 FA Not Set</p> <p>B2B03 FA Not Set</p>	<p>8 failures out of 10 samples</p> <p>1 Sec / Sample</p>	Type C, No SVS "Emissio ns Neutral Diagnost ics – Type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit Low	B2B0D	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit Low error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Ignition Switch Run/Start Position Circuit Low DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module	  is being received  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit High	B2B0E	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit High error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Ignition Switch Run/Start Position Circuit High DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module	  is being received  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Control Module Memory Failure	B2B12	This DTC monitors for a CGM Control Module Memory Failure error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Control Module Memory Failure DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module	is being received  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Control Module Internal Performance Failure	B2B13	This DTC monitors for a CGM Control Module Internal Performance Failure error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Control Module Internal Performance Failure DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module	  is being received  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Blower Fan Feedback Message Counter Incorrect	B2B38	This DTC monitors for an error in communication with the Front Blower Fan Feedback Message.	<p>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:</p> <p>Speed Feedback Duty Cycle Signal ARC</p> <p>Speed Feedback Frequency Signal ARC</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type C, No SVS "Emissions Neutral Diagnostics – Type C"



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Remote PRNDL Display Internal Electronic Failure	B2B9B	Detects an indicator LED circuit with a latent fault where an indicator LED could light with a single fault.	When sequencing transistors circuit feedback current	> 520 uA	Ignition  DTCs not set:	Run or Run/Crank  P17DD OR P17DE	detected within 50 ms at first key up	Type C, Regular, No MIL.

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit Low	C124F	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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional  update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\leq -3.8500$ g  $\geq -3.8500$ g  ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00$ volts $\geq 11.00$ volts = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit High	C1250	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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional  update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\geq 3.8500 \text{ g}$  $\leq 3.8500 \text{ g}$  ( $\leq 0.5 \Omega$ impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal)  update raw lateral acceleration signal fail, 50 millisecond update rate	$\geq 0.5300 \text{ g}$  $\leq 3.8500 \text{ g}$	battery voltage run crank voltage diagnostic monitor enable  update raw lateral acceleration signal stability time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear  ABS(raw lateral acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ = 1 Boolean    $\geq 15.0 \text{ KPH}$ = TRUE  = TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit Low	C1252	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.  Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional  update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\leq -3.8500$ g  $\geq -3.8500$ g  ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00$ volts $\geq 11.00$ volts = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw longitudinal acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit High	C1253	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.  Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional  update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\geq 3.8500$ g  $\leq 3.8500$ g  ( $\leq 0.5 \Omega$ impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00$ volts $\geq 11.00$ volts = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw longitudinal acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	<p>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.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)</p> <p>update raw longitudinal acceleration signal fail time, 50 millisecond update rate</p> <p>update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate</p>	≥ 0.5300 g	<p>battery voltage run crank voltage diagnostic monitor enable region 1 specific enable</p> <p>update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnostic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)</p> <p>update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed</p>	<p>≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean</p> <p>≥ 15.0 KPH ≤ 0.5300 g</p> <p>= TRUE</p> <p>= TRUE = TRUE = FALSE</p> <p>= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g</p> <p>≤ 3.8500 g</p> <p>≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g</p> <p>≥ 15.0 KPH ≤ 200.0 KPH</p>	<p>raw longitudinal acceleration signal stability time ≥ 10.0 seconds</p> <p>raw longitudinal acceleration signal fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate</p> <p>region 1 fail time ≥ 75.0 seconds out of region 1 sample time ≥ 120.0 seconds, 50 millisecond update rate</p>	Emission Neutral Diagnostic – Type C

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)  update raw longitudinal acceleration signal fail time, 50 millisecond update rate  update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable  update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean  ≥ 15.0 KPH ≤ 0.5300 g  = TRUE  = TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g  ≤ 3.8500 g	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds  raw longitudinal acceleration signal fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate  region 2 fail time ≥ 75.0 seconds out of region 2 sample time ≥ 120.0 seconds, 50 millisecond update rate	



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	$\leq 0.70 \%$ $\geq 80.0 \text{ Nm}$ $\geq 0.1500 \text{ g}$ $\geq 0.0 \text{ KPH}$ $\leq 0.0 \text{ KPH}$ $< 0.5300 \text{ g}$ = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	$\geq 0.0000 \text{ g}$	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnostic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ = 1 Boolean = 0 Boolean $\geq 15.0 \text{ KPH}$ $\leq 0.5300 \text{ g}$ = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time $\geq 10.0$ seconds raw longitudinal acceleration signal fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate region 3 fail time $\geq 75.0$ seconds out of region 3 sample time $\geq 120.0$ seconds, 50 millisecond update rate	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)  update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed  ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = 1st thru 10th ≥ 0.5300 g  ≤ 3.8500 g  ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)  update raw longitudinal acceleration signal fail time, 50 millisecond update rate  update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable  update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean  ≥ 15.0 KPH ≤ 0.5300 g  = TRUE  = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds  raw longitudinal acceleration signal fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					diagnosotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)  update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed  ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g  ≤ 3.8500 g   ≤ 0.70 % ≤ 80.0 Nm ≤ 0.1500 g  ≥ 0.0 KPH ≤ 0.0 KPH  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time ≥ 75.0 seconds out of region 4 sample time ≥ 120.0 seconds, 50 millisecond update rate	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Availability Status Message Counter Incorrect	C1280	This DTC monitors for an error in the Electric Park Brake Availability Status Message Counter.	<p>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:</p> <p>Electric Park Brake Status ARC</p> <p>Electric Park Brake Availability Status PV</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type C, No SVS

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Application Status Message Counter Incorrect	C1281	This DTC monitors for an error in Electric Park Brake Application Status Message Counter.	<p>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:</p> <p>Electric Park Brake Applied Status PV</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type C, No SVS

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	<p>P0010 is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 1)  Cam Position Error > ( <b>P0011_CamPosErrorLimlc1</b> ) deg	<b>Intake Cam Phsr Enable</b>  System Voltage  Engine Running  Power Take Off (PTO) active  Desired cam position  Desired AND Measured cam position        Desired cam position variation          No Active DTCs	= TRUE  > 11.00 Volts  = TRUE  = FALSE  > 0 deg  > ( <b>P0011_CamPosErrorLimlc1</b> ) deg AND < ( <b>CalculatedPerfMaxlc1</b> ) deg  < 3.00 deg for ( <b>P0011_P05CC_StablePositionTimeIc1</b> ) seconds  P0010 P2088 P2089	135.00 failures out of 150.00 samples  100 ms /sample	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Open – Bank 1	P0013	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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	<p>P0013 is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Exhaust cam Bank 1)  Cam Position Error > ( <b>P0014_CamPosErrorLimEc1</b> ) deg	<b>Exhaust Cam Phsr Enable</b>  System Voltage  Engine Running  Power Take Off (PTO) active  Desired cam position  Desired AND Measured cam position        Desired cam position variation          No Active DTCs	= TRUE  > 11.00 Volts  = TRUE  = FALSE  > 0 deg  > ( <b>P0014_CamPosErrorLimEc1</b> ) deg AND < ( <b>CalculatedPerfMaxEc1</b> ) deg  < 3.00 deg for ( <b>P0014_P05CE_StablePositionTimeEc1</b> ) seconds  P0013 P2090 P2091	135.00 failures out of 150.00 samples  100 ms /sample	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 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  Out of range values are:  cam edge measurement OR cam edge measurement from the expected nominal cam position	 >= 4 cam edges   <div> <div>&lt; -8.5 Crank Degrees</div> <div>&gt; 12.4 Crank Degrees</div> </div>	Crankshaft and camshaft position signals are synchronized  Engine is Spinning  Cam phaser control indicates the phaser is 'parked'  No Active DTCs:  Time since last execution of a test  IntCamECC_OilPresLow	Test is Enabled       CrankSensor_FA P0340, P0341  <div> <div>&gt; 1.0 sec</div> <div>= FALSE</div> </div>	4 cam edge measurements and 1 test sample per engine cycle  Test failure is 4 fails in 5 samples  Diagnostic failure is 2 failed tests out of 3  If the first test fails, the next test is delayed to confirm the phaser 'parked'  This delay time is defined by <b>P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold</b>  For mid-park phasers, an additional delay <b>P0016-0019 Mid-Park Phaser Delay</b> is applied	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B 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  Out of range values are:  cam edge measurement OR cam edge measurement from the expected nominal cam position	 >= 4 cam edges   <div> <div>&lt; -8.5 Crank Degrees</div> <div>&gt; 12.4 Crank Degrees</div> </div>	Crankshaft and camshaft position signals are synchronized  Engine is Spinning  Cam phaser control indicates the phaser is 'parked'  No Active DTCs:  Time since last execution of a test  ExhCamECC_OilPresLow	Test is Enabled       CrankSensor_FA P0365, P0366  <div> <div>&gt; 1.0 sec</div> <div>= FALSE</div> </div>	4 cam edge measurements and 1 test sample per engine cycle  Test failure is 4 fails in 5 samples  Diagnostic failure is 2 failed tests out of 3  If the first test fails, the next test is delayed to confirm the phaser 'parked'  This delay time is defined by <b>P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold</b>  For mid-park phasers, an additional delay <b>P0016-0019 Mid-Park Phaser Delay</b> is applied	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 1 Control Circuit Open	P001A	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	≥ 200 K Ω impedance between signal and controller ground.	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 1 Control Circuit Low Voltage	P001B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 solenoid driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between signal and controller ground	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 1 Control Circuit High Voltage	P001C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnosis is Enabled  System supply Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 1 Circuit Open	P002A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 1 Circuit Low Voltage	P002B	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 solenoid 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 1 Circuit High Voltage	P002C	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between output and controller ground.	Diagnostic is Enabled  Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips Note: In certain controlle rs P0031 may also set

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0031	Controller specific output driver circuit diagnoses the heater output 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between output and controller ground.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	<p>= Crank or Run &gt; 11.0 volts &gt; 400 RPM</p>	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	<p>Type B, 2 Trips Note: In certain controllers P0030 may also set</p>

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between output and controller power.	Diagnostic is Enabled  Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit	P0033	<p>Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for an open circuit failure, when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	≥ 200 K Ω impedance between output and controller ground	<p>Diagnostic enabled *****</p> <p>Powertrain relay voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>&gt;= 11.0 Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controllers P0034 may also set turbo/super charger bypass valve control circuit low</p>

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit Low	P0034	<p>Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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.</p> <p>In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	≤ 0.5 Ω impedance between output and controller ground	<p>Diagnostic Enabled *****</p> <p>Powertrain relay voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>&gt;= 11.0 Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	<p>Type A, 1 Trips Note: In certain controllers P0033 may also set turbo/ super charger bypass valve control circuit</p>

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit High	P0035	<p>Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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.</p> <p>In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	$\leq 0.5 \Omega$ impedance between output and controller power.	<p>Diagnostic enabled *****</p> <p>Powertrain relay voltage *****</p> <p>Engine does not crank Diagnostic system not disabled</p>	<p>True *****</p> <p><math>\geq 11.0</math> Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between output and controller ground.	Diagnostic is Enabled  Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips Note: In certain controlle rs P0037 may also set



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0037	Controller specific output driver circuit diagnoses the heater output 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.	$\leq 0.5 \Omega$ impedance between output and controller ground.	Diagnostic is Enabled  Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips Note: In certain controlle rs P0036 may also set

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between output and controller power.	Diagnostic is Enabled  Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 1 Performance	P003C	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 1	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 1 Pin Stuck	P003D	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 1 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	<p>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.</p> <p>This fault is set if the heater resistance is outside the expected range.</p>	Heater Resistance outside of the expected range of	4.2 < ohms < 8.2	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time</p>	<p>ECT_Sensor_FA P262B IAT_SensorFA &lt; 8.0 °C &gt; 28,800 seconds ≥ -30.0 °C &lt; 32.0 volts &lt; 0.09 seconds</p>	Once per valid cold start	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 1 Performance	P005A	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 1	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnosis is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	<p>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</p> <p>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</p>	<p>Table, f(TPS). See supporting tables: <b>P0068_Delta MAP Threshold f(TPS)</b></p> <p>Table, f(TPS). See supporting tables: <b>P0068_Delta MAF Threshold f(TPS)</b></p> <p>Table, f(RPM). See supporting tables: <b>P0068_Maximum MAF f(RPM)</b></p> <p>Table, f(Volts). See supporting tables: <b>P0068_Maximum MAF f(Volts)</b></p>	<p>Engine Speed</p> <p>Run/Crank voltage</p>	<p>&gt; 800 RPM</p> <p>&gt; 6.41 Volts</p>	<p>Continuously fail MAP and MAF portions of diagnostic for 0.1875 s</p> <p>Continuous in MAIN processor</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	<p>Detects an Outside Air Temperature (OAT) sensor that is stuck in range. There are two components to the test: an engine off component, and an engine running component.</p> <p>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.</p> <p>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.</p> <p>For applications that have ability to move without engaging the internal combustion</p>	<p><b>Engine Off:</b></p> <p>If IAT &gt;= OAT: IAT - OAT</p> <p>If IAT &lt; OAT: OAT - IAT</p> <p>If either of the following conditions are met, this diagnostic will pass:</p> <p>If IAT &gt;= OAT: IAT - OAT</p> <p>If IAT &lt; OAT: OAT - IAT</p>	<p>&gt; 15.0 deg C</p> <p>&gt; 15.0 deg C</p> <p>&lt;= 15.0 deg C</p> <p>&lt;= 15.0 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Engine is not running</p> <p>Vehicle Speed</p> <p>Coolant Temperature - IAT</p> <p>IAT - Coolant Temperature</p> <p>OAT-to-IAT engine off equilibrium counter</p> <p>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</p> <p><b>P0071: OAT Performance Drive Equilibrium Engine Off</b></p> <p>No Active DTCs:</p>	<p>&gt;= 28,800.0 seconds</p> <p>&gt;= 15.5 MPH</p> <p>&lt; 15.0 deg C</p> <p>&lt; 15.0 deg C</p> <p>&gt;= 300.0 counts</p> <p>VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA</p>	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.				EngineModeNotRunTimer Error		
		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.	<b>Engine Running:</b>  If IAT >= OAT: IAT - OAT  If IAT < OAT: OAT - IAT  If either of the following conditions are met, this diagnostic will pass:  If IAT >= OAT: IAT - OAT  If IAT < OAT: OAT - IAT	> 15.0 deg C  > 15.0 deg C          <= 15.0 deg C  <= 15.0 deg C	Diagnostic is Enabled  Time between current ignition cycle and the last time the engine was running  Engine is running  Vehicle Speed  Engine air flow  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 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 <b>P0071: OAT Performance Drive Equilibrium Engine Running</b>  No Active DTCs:	>= 28,800.0 seconds     >= 15.5 MPH  >= 10.0 grams/second   >= 300.0 counts	Executed every 100 msec until a pass or fail decision is made	
						VehicleSpeedSensor_FA		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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.</p> <p>While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for</p>				IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error		

21OBDG03D ECM Summary Tables

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

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 deg C)	Diagnostic is Enabled		40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	$\geq 427,757$ Ohms ( $\sim -60$ deg C)	Diagnostic is Enabled		40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where:</p> <p>"String Length" = sum of "Diff" calculated over</p> <p>And where:</p> <p>"Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)</p>	<p>&gt; 100 deg C</p> <p>10 consecutive OAT readings</p>	Diagnostic is Enabled		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  High Pressure Fuel Pump Delivery Angle	 >= 92 °          ≤ 0 °	High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure          Barometric Pressure Inlet Air Temp    Fuel Temp   Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True   ≥ 11 Volts  > 0.275 MPa   Enabled when a code clear is not active or not exiting device control  Engine is not cranking   ≥ 70.0 KPA ≥ -20.0 degC   -12 ≤ Temp degC ≤ 132	Windup High/ Low  10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

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



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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  Battery Voltage	>= 50 RPM  >= 11 Volts  Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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  Battery Voltage	>= 50 RPM  >= 11 Volts  Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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  Battery Voltage	>= 50 RPM  >= 11 Volts  Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor and 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 IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 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.	<b><u>Good Correlation Between IAT and IAT3:</u></b>  ABS(Power Up IAT - Power Up IAT2)  AND  ABS(Power Up IAT - Power Up IAT3)  AND  ABS(Power Up IAT2 - Power Up IAT3)	  > 30 deg C  <				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	<p><b><u>Not Good Correlation, IAT3 in middle:</u></b></p> <p>Power Up IAT3 is between Power Up IAT and Power Up IAT2</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT3 - Power Up IAT2) &gt; ABS(Power Up IAT3 - Power Up IAT)</p>	> 30 deg C	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt; 28,800 seconds</p> <p>&gt;= 11.0 Volts</p> <p>&gt;= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	Executes once at the beginning of each ignition cycle if enable conditions are met	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF)	P0097	<p>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.</p> <p>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.</p>	IAT 2 Temperature	< -60 degrees C	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 High (applications with LIN MAF)	P0098	<p>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.</p> <p>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.</p>	IAT 2 Temperature	> 150 degrees C	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity)	P0099	<p>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.</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)</p>	<p>&gt; 100.00 deg C</p> <p>10 consecutive IAT 2 readings</p>	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	Circuit Continuity This DTC detects a short to ground in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	RCT Resistance (@ 150°C)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT (Radiator Coolant temperature) signal circuit or the RCT 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temperature Sensor Circuit Intermittent/ Erratic	P00B5	Circuit Erratic This DTC detects large step changes in the RCT (Radiator Coolant temperature) signal circuit or the RCT 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_RCT_Erratic_TFT KO</p> <p>EECR_RCT_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6  The calculated high and low limits for the next reading use the following calibrations:  Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	    10.0 seconds -60.0 °C 150.0 °C  10.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  7.0 seconds -60.0 °C 150.0 °C				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	<p>The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking</p> <p>Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value</p> <p>Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value</p>	<p>&lt; <b>P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery</b> (see Supporting Table)</p> <p>&lt;= <b>P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start</b> (see Supporting Table)</p>	<p>High Pressure Rise Diagnostic During Start</p> <p>High Pressure Fall Diagnostic During Start</p> <p>Low side feed fuel pressure</p> <p>Engine Run Time Run/Crank Voltage Engine Coolant</p> <p>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 when the engine is cranking.</p>	<p>Enabled</p> <p>Disabled</p> <p>&gt;= 0 KPA</p> <p>&lt; = 0 sec &gt; 8 Volts -100 &lt;= °C &lt;= 132</p> <p>All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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 active and Device control</p>	<p>Pressure Rise Test: Crank Time &gt;= <b>P00C6 - High Pressure Pump Control Mode timeout</b> (see Supporting Table) 6.25 ms per sample</p> <p>Pressure Fall Test: Injected cylinder events &gt;= <b>P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFailLoThresh after High Pressure Start</b> (see Supporting Table)</p> <p>4 samples per engine rotation</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measuremen t System - Multiple Sensor Correlation (single turbo)	P00C7	<p>Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor.</p> <p>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), Turbocharger Boost Pressure 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, Turbocharger Boost Pressure and BARO are compared to see if their values are similar.</p> <p>If two of these three sensors have similar values, but the third does not, then this monitor will fail. This monitor will also fail if there is no combination</p>	<p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure)</p>	<p>&gt; 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&gt; 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&gt; 10.0 kPa</p> <p>&lt;= 10.0 kPa</p> <p>&gt; 10.0 kPa</p> <p>&gt; 10.0 kPa</p>	<p>Time between current ignition cycle and the last time the engine was running</p> <p>Engine is not rotating</p> <p>Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure</p> <p>No Active DTCs:</p> <p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>	<p>&gt; 5.0 seconds</p> <p>&gt;= 50.0 kPa &lt;= 115.0 kPa &gt;= 50.0 kPa &lt;= 115.0 kPa &gt;= 50.0 kPa &lt;= 115.0 kPa</p> <p>EngineModeNotRunTimer Error MAP_SnsrFA AAP_SnsrFA AAP2_SnsrFA AAP_LIN1_SnsrCktFA</p> <p>MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP</p>	<p>4 failures out of 5 samples</p> <p>1 sample every 12.5 msec for applications without LIN MAF</p> <p>1 sample every 25 msec for applications with LIN MAF</p>	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		of two of these three sensors reporting similar values and the failed sensor cannot be uniquely identified.	AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa				
			Manifold Pressure OR Manifold Pressure  OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 50.0 kPa  > 115.0 kPa   > 10.0 kPa > 10.0 kPa ≤ 10.0 kPa	Time between current ignition cycle and the last time the engine was running  Engine is not rotating  No Active DTCs:   No Pending DTCs:   Diagnostic is Enabled  LIN communications established with MAF	> 5.0 seconds  EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA  MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples  1 sample every 12.5 msec for applications without LIN MAF  1 sample every 25 msec for applications with LIN MAF	
			Turbocharger Boost Pressure OR Turbocharger Boost Pressure  OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND	< 50.0 kPa  > 115.0 kPa   ≤ 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running  Engine is not rotating  No Active DTCs:	> 5.0 seconds  EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA	4 failures out of 5 samples  1 sample every 12.5 msec for applications without LIN MAF  1 sample every 25 msec for applications with LIN MAF	
			AND					

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa	No Pending DTCs:  Diagnostic is Enabled  LIN communications established with MAF	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP		
			Barometric Pressure OR Barometric Pressure  OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 50.0 kPa  > 115.0 kPa   > 10.0 kPa  <= 10.0 kPa  > 10.0 kPa	Time between current ignition cycle and the last time the engine was running  Engine is not rotating  No Active DTCs:   No Pending DTCs:  Diagnostic is Enabled  LIN communications established with MAF	> 5.0 seconds   EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA  MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples  1 sample every 12.5 msec for applications without LIN MAF  1 sample every 25 msec for applications with LIN MAF	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Battery Voltage	>= 50 RPM >= 11 Volts  Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	P00CA	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.  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 Battery Voltage	>= 50 RPM >= 11 Volts  Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P00E9	Detects an Intake Air Temperature 3 (IAT3) sensor value that is stuck in range by comparing the IAT3 sensor value against the IAT and IAT2 sensor values and failing the diagnostic if the IAT3 value is more different than the IAT and IAT2 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.	<b><u>Good Correlation Between IAT and IAT2:</u></b>  ABS(Power Up IAT - Power Up IAT2)  AND  ABS(Power Up IAT - Power Up IAT3)  AND  ABS(Power Up IAT2 - Power Up IAT3)	  ≤ 30 deg C      <div>&gt; 25 deg C</div>   <div>&gt; 25 deg C</div>	Diagnostic is Enabled  Time between current ignition cycle and the last time the engine was running  Powertrain Relay Voltage for a time  (Engine Coolant Temp - Outside Ambient Temp)  No Active DTCs:         LIN communications established with MAF	      <div>&gt; 28,800 seconds</div>  <div>≥ 11.0 Volts ≥ 0.9 seconds</div>   <div>≤ 99.0 deg C</div>  PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
		The diagnostic will fail if the IAT and IAT2 values are similar, and the IAT3 value is not similar to the IAT and IAT2 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT3 value is furthest from the sensor value that is in the middle of the three sensor values.  This diagnostic is executed once per ignition cycle if the	<b><u>Not Good Correlation, IAT in Middle:</u></b>  Power Up IAT is between Power Up IAT2 and Power Up IAT3  AND  ABS(Power Up IAT2 - Power Up IAT3)  AND  ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	      <div>&gt; 25 deg C</div>	Diagnostic is Enabled  Time between current ignition cycle and the last time the engine was running  Powertrain Relay Voltage for a time  No Active DTCs:	      <div>&gt; 28,800 seconds</div>  <div>≥ 11.0 Volts ≥ 0.9 seconds</div>  PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		enable conditions are met.			LIN communications established with MAF			
			<p><b><u>Not Good Correlation. IAT2 in Middle:</u></b></p> <p>Power Up IAT2 is between Power Up IAT and Power Up IAT3</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT3) &gt; ABS(Power Up IAT2 - Power Up IAT)</p>	> 25 deg C	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt; 28,800 seconds</p> <p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	Executes once at the beginning of each ignition cycle if enable conditions are met	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low (applications with manifold temperature and humidity)	P00EA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 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 IAT 3 Input	< 57.94 Ohms (~150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	P00EB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 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 IAT 3 Input	> 153,665 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	<p>Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected.</p> <p>When the value of the IAT3 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 IAT3 readings. The result of this summation is called a "string length".</p> <p>Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)</p>	<p>&gt; 80.00 deg C</p> <p>10 consecutive IAT 3 readings</p>	Diagnostic is Enabled		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low (applications with LIN MAF)	P00F4	<p>Detects an erroneously 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.</p> <p>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.</p>	Relative Humidity	<= -6.25 %	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High (applications with LIN MAF)	P00F5	<p>Detects an erroneously 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.</p> <p>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.</p>	Relative Humidity	>= 106.25 %	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Intermittent	P00F6	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)</p>	<p>&gt; 80 %</p> <p>10 consecutive Humidity readings</p>	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt;= 11.0 Volts &gt;= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (single turbo)	P0101	<p>Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS).</p> <p>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</p>	<p>See table <b>P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</b> for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND</p>	<p>&gt; 20.0 grams/sec</p> <p>&gt; 25.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 250 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>&gt;= 400 RPM &lt;= 6,200 RPM</p> <p>&gt;= -9 Deg C</p> <p>= TRUE)</p> <p>&lt;= 130 Deg C</p> <p>= FALSE)</p> <p>&gt;= -20 Deg C &lt;= 100 Deg C</p> <p>&gt;= 0.50</p> <p>Modeled Air Flow Error multiplied by <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM</b> and <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est</b></p> <p>MAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</b></p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.	<p>Measured TIAP - measured MAP - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Offset</b></p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Offset</b></p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p> <p>-</p>	<p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 1.0 seconds</p> <p>&gt; 1.0 seconds</p> <p>&gt; a threshold in gm/sec as a function of engine speed. See table</p>	<p>No Active DTCs:</p> <p>No Pending DTCs:</p>	<p>MAP Model 2 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</b></p> <p>MAP Model 3 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</b></p> <p>TIAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</b></p> <p>Filtered Throttle Model Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</b></p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p><b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min Air Flow</b></p> <p>&gt; a threshold in kPa as a function of engine speed. See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</b></p> <p>&lt; 3.0 gm/sec</p> <p>&lt; a threshold in gm/sec as a function of engine speed. See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</b></p> <p>&lt; a threshold in kPa as a function of engine speed. See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</b></p> <p>&lt; 3.0 gm/sec</p>	Diagnostic is Enabled	MnfdTempSensorCktFP		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit Low Frequency (all MAF suppliers except for Continental)	P0102	<p>Detects a continuous short to ground in the MAF sensor circuit or a MAF sensor that 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 low engine air flow.</p> <p>The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the mass air flow across the sensor. The mass air flow 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.</p>	MAF Output	<= 750 Hertz (<= 0.00 gm/sec)	<p>Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time</p> <p>Diagnostic is Enabled</p>	<p>&gt; 0.0 seconds &gt;= 300 RPM &gt;= 9.1 Volts</p> <p>&gt;= 0.5 seconds</p>	<p>200 failures out of 250 samples</p> <p>1 sample every cylinder firing event</p>	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency (all MAF suppliers except for Continental)	P0103	<p>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 high engine air flow.</p> <p>The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the mass air flow across the sensor. The mass air flow 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.</p>	MAF Output	>= 13,350 Hertz (>= 459.0 gm/sec)	<p>Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time</p> <p>Diagnostic is Enabled</p>	<p>&gt; 0.0 seconds &gt;= 300 RPM &gt;= 9.1 Volts</p> <p>&gt;= 0.5 seconds</p>	<p>200 failures out of 250 samples</p> <p>1 sample every cylinder firing event</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (single turbo)	P0106	<p>Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS).</p> <p>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</p>	<p><b>Engine Running:</b></p> <p>See table <b>P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</b> for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when</p> <p>High Engine Air Flow is</p>	<p>&gt; 20.0 grams/sec</p> <p>&gt; 25.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 250 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>&gt;= 400 RPM &lt;= 6,200 RPM</p> <p>&gt;= -9 Deg C</p> <p>= TRUE)</p> <p>&lt;= 130 Deg C</p> <p>= FALSE)</p> <p>&gt;= -20 Deg C &lt;= 100 Deg C</p> <p>&gt;= 0.50</p> <p>Modeled Air Flow Error multiplied by <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM</b> and <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est</b></p> <p>MAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</b></p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.	<p>TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Offset</b></p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Offset</b></p> <p>TIAP Correlation is valid when</p> <p>High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 1.0 seconds</p> <p>&gt; 1.0 seconds</p> <p>&gt; a threshold in gm/sec as a function of engine speed See table</p>	<p>No Active DTCs:</p> <p>No Pending DTCs:</p>	<p>MAP Model 2 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</b></p> <p>MAP Model 3 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</b></p> <p>TIAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</b></p> <p>Filtered Throttle Model Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</b></p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP</p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			-	<b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow</b>	Diagnostic is Enabled	IAT_SensorCircuitFP MnfdTempSensorCktFP		
		AND Manifold Pressure		> a threshold in kPa as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP</b>				
		AND Filtered Mass Air Flow - Mass Air Flow		< 3.0 gm/sec				
		Low Engine Air Flow is TRUE when Mass Air Flow		< a threshold in gm/sec as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow</b>				
		AND Manifold Pressure		< a threshold in kPa as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP</b>				
		AND Mass Air Flow - Filtered Mass Air Flow		< 3.0 gm/sec				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 (This is equal to 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples  1 sample every 12.5 msec	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 85.8 % of 5 Volt Range (This is equal to 371.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples  1 sample every 12.5 msec	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0111	<p>Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 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.</p>	<p><b><u>Good Correlation Between IAT2 and IAT3</u></b></p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT3)</p>	<p>&gt; 30 deg C</p> <p>&gt; 25 deg C</p> <p>&lt;= 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt; 28,800 seconds</p> <p>&gt;= 11.0 Volts</p> <p>&gt;= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	Type B, 2 Trips
		<p>The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values.</p> <p>This diagnostic is executed once per</p>	<p><b><u>Not Good Correlation, IAT2 in Middle:</u></b></p> <p>Power Up IAT2 is between Power Up IAT and Power Up IAT3</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT) &gt; ABS(Power Up IAT2 - Power Up IAT3)</p>	<p>&gt; 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt; 28,800 seconds</p> <p>&gt;= 11.0 Volts</p> <p>&gt;= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	<p><b><u>Not Good Correlation, IAT3 in Middle:</u></b></p> <p>Power Up IAT3 is between Power Up IAT and Power Up IAT2</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT3 - Power Up IAT) &gt; ABS(Power Up IAT3 - Power Up IAT2)</p>	> 30 deg C	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>&gt; 28,800 seconds</p> <p>&gt;= 11.0 Volts</p> <p>&gt;= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	Executes once at the beginning of each ignition cycle if enable conditions are met	



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Low (applications with LIN MAF)	P0112	<p>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.</p> <p>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.</p>	IAT Temperature	< -60 degrees C	<p>Diagnostic is Enabled</p> <p>LIN Communications established with MAF</p>		<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High (applications with LIN MAF)	P0113	<p>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.</p> <p>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.</p>	IAT Temperature	> 150 degrees C	<p>Diagnostic is Enabled</p> <p>LIN Communications established with MAF</p>		<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	<p>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.</p> <p>When the value of the IAT 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 IAT readings. The result of this summation is called a "string length".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)</p>	<p>&gt; 80.00 deg C</p> <p>10 consecutive IAT readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

**210BDG03D ECM Summary Tables**

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Erratic 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5</p> <p>Temperature Sensor 7:</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	ECT_Sensor_Ckt_FA EECR_EngineOut_Erratic _TFTKO	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_EngCoolant TempSnsr6</p> <p>The calculated high and low limits for the next reading use the following calibrations:</p> <p>Temperature Sensor 1:</p> <p>1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 2:</p> <p>1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 3:</p> <p>1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 4:</p> <p>1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 5:</p> <p>1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 6:</p> <p>1) Sensor time constant</p>	<p>10.0 seconds -60.0 °C 150.0 °C</p> <p>10.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>7.0 seconds</p>				

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2) Sensor low limit 3) Sensor high limit  Temperature Sensor 7:  1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	-60.0 °C 150.0 °C   5.0 seconds -60.0 °C 150.0 °C				



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (single turbo)	P0121	<p>Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Mass Air Flow (MAF) sensor.</p> <p>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</p>	<p>See table <b>P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</b> for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when</p> <p>High Engine Air Flow is TRUE AND Measured TIAP -</p>	<p>&gt; 20.0 grams/sec</p> <p>&gt; 25.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 250 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>&gt;= 400 RPM &lt;= 6,200 RPM</p> <p>&gt;= -9 Deg C</p> <p>= TRUE)</p> <p>&lt;= 130 Deg C</p> <p>= FALSE)</p> <p>&gt;= -20 Deg C &lt;= 100 Deg C</p> <p>&gt;= 0.50</p> <p>Modeled Air Flow Error multiplied by <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM</b> and <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est</b></p> <p>MAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</b></p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Performance diagnostic will fail.	<p>measured MAP - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</b></p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</b></p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND</p>	<p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 1.0 seconds</p> <p>&gt; 1.0 seconds</p> <p>&gt; a threshold in gm sec as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow</b></p>	<p>No Active DTCs:</p> <p>No Pending DTCs:</p>	<p>MAP Model 2 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</b></p> <p>MAP Model 3 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</b></p> <p>TIAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</b></p> <p>Filtered Throttle Model Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</b></p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</p>		

## 21OBDG03D ECM Summary Tables

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## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 <	0.3250 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	79 / 159 counts;  57 counts continuous;  3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	4.750 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	79 / 159 counts;  57 counts continuous;  3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Energy is accumulated after the first combustion event using Range 1, 2 or 3:</p> <p>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.</p> <p><b>Range 1 (Primary):</b> Ambient air temperature is between 10.0 and 52.0 °C</p> <p>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 20.0 °C. The target temperature for this range will not drop below 71.0 °C</p> <p><b>Range 2 (Secondary):</b> Ambient air temperature is between -9.0 and 10.0 °C</p> <p>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 36.0 °C. The target temperature for this range will not drop below 36.0 °C</p>	<p><b>P0128 Maximum Acculated Energy - Primary</b></p> <p><b>P0128 Maximum Acculated Energy - Secondary</b></p>	<p>Diagnostic is Enabled</p> <p>No DTCs</p> <p>Engine soak time Engine run time Engine Outlet Coolant Temperature</p> <p>- Range 1: - Range 2: - Range 3:</p> <p>Devices in main cooling circuit are not in in device control</p> <p>If Engine RPM is continuously greater than for this time period</p> <p>Distance traveled</p>	<p>THMR_AWP_AuxPumpF A THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_FlowStuckO n_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccura te MAF_SensorFA ETHR_CoolantEnergyMo del ETHR_RemedialActionLe vel1 ETHR_RemedialActionLe vel2 ETHR_RemedialActionLe vel3 EECR_EngineOutlet_FA</p> <p>&gt; 1,800.0 seconds 10.0 - 1,800.0 seconds</p> <p>≤ 51.6 °C ≤ 35.6 °C ≤ 35.6 °C</p> <p>9,999 rpm 5.0 seconds</p> <p>≥ 1.0 km</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per ignition key cycle</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>C</p> <p><b>Range 3 (Tertiary):</b> Ambient air temperature is between -9.0 and -9.0 °C</p> <p>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 36.0 °C. The target temperature for this range will not drop below 36.0 °C</p>	<p><b>P0128 Maximum Accumulated Energy - Tertiary</b></p> <p>This diagnostic models the net energy into and out of the cooling system during the warm-up process.</p> <p>The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to environment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop.</p>	<p>The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off</p>	<p>&gt; 5.0 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM)	P0131	<p>This DTC determines if the WRAF O2 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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:</p> <p>A) Pump Current - short to ground fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.</p> <p>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).</p> <p><u>Note:</u> A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC.</p>	<p>The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is &lt; 150mV.</p> <p>Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag.</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>*****</p>	<p>P0135, P0030, P0031 or P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:</p>	<p>The ASIC provides a fault indication when the pump current, reference cell, reference ground or</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p>	<p>P0135, P0030, P0031 or P0032</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p>	



# 210BDG03D ECM Summary Tables

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

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM	P0132	<p>This DTC determines if the WRAF O2 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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:</p> <p>A) Pump Current - short to power fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to power fail counts are accumulated to determine fault status.</p> <p>D) Trim Circuit - short to power fail counts are accumulated to determine fault status</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental)..</p>	<p>The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is <math>\geq 5.2V</math>.</p> <p>Note: the faults must exist for more than 100 msec to qualify for a fail flag.</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p> <p>Measure Valid Status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>*****</p>	<p>P0135, P0030, P0031 or P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p><math>\geq 20.0</math> seconds</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Frequency: Continuous in 25 milli - second loop</p>	Type B, 2 Trips

**210BDG03D ECM Summary Tables**

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

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 1	P0135	<p>This DTC determines if the O2 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.</p> <p>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.</p>	Heater Current outside of the expected range of	$0.3 < \text{Amps} < 4.3$	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage Heater Warm-up delay O2S Heater device control</p> <p>B1S1 O2S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>&gt; 11.0 Volts = Complete</p> <p>= Not active</p> <p>&gt; zero</p> <p>&gt; 120 seconds</p>	<p>8 failures out of 10 samples</p> <p>Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0137	<p>This DTC determines if the O2 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the O2S signal and compares it to the threshold.</p> <p>The diagnostic failure counter is incremented if the O2S signal is below the threshold value. This DTC is set based on the fail and sample counters.</p>	Oxygen Sensor Signal	< 40 mvolts	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active</p>	<p>TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR_System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA</p> <p>= Not active = Not active = Not active = Not active 11.0 &lt; Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.991 ≤ ratio ≤ 1.040 60 ≤ mgrams ≤ 500 = Closed Loop = TRUE (Please see "<b>Closed Loop Enable</b>")</p>	<p>320 failures out of 400 samples</p> <p>Frequency: Continuous in 100 milli - second loop</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

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



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	<p>This DTC determines if the O2 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the O2S signal and compares it to the threshold.</p> <p>The diagnostic failure counter is incremented if the O2S signal is above the threshold value. This DTC is set based on the fail and sample counters.</p>	Oxygen Sensor Signal	> 1,050 mvolts	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>AFM Status</p> <p>Heater Warm-up delay</p> <p>Engine Run Time</p> <p>Engine Run Accum</p> <p>Low Fuel Condition</p> <p>Only when</p> <p>FuelLevelDataFault</p> <p>*****</p> <p>Secondary delay after above conditions are complete (cold start condition)</p> <p>Secondary delay after above conditions are complete (not cold start condition)</p> <p>Commanded Equivalence Ratio</p> <p>*****</p> <p>All of the above met for</p>	<p>TPS_ThrottleAuthorityDefaulted</p> <p>MAF_SensorFA</p> <p>MAP_SensorFA</p> <p>EvapExcessPurgePsbl_FA</p> <p>FuelInjectorCircuit_FA</p> <p>Ethanol Composition Sensor FA</p> <p>AIR System FA</p> <p>11.0 &lt; Volts</p> <p>= All Cylinders active</p> <p>= Complete</p> <p>&gt; 5.0 seconds</p> <p>&gt; 30.0 seconds</p> <p>= False</p> <p>= False</p> <p>*****</p> <p>&gt; 150.0 seconds when engine soak time &gt; 28,800 seconds</p> <p>&gt; 150.0 seconds when engine soak time ≤ 28,800 seconds</p> <p>≤ 1.040 EQR</p> <p>*****</p> <p>&gt; 3.0 seconds</p>	<p>100 failures out of 125 samples</p> <p>Frequency: Continuous in 100 milli - second loop</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	<p>The P013A diagnostic is the third in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.</p> <p>Note: The Primary method is used when the secondary O2 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P013A diagnostic measures the secondary O2 sensor voltage response rate</p>	<p>Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.28 coefficient.</p> <p>OR</p> <p>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)</p>	<p>&gt; 8.0 units ≤ 7.2 units</p> <p>&gt; 60.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013B, P013E, P013F, P2270 or P2271</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.</p>	<p>Type A, 1 Trips EWMA</p>

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized integral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013A is set when the EWMA value exceeds the EWMA threshold. 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.</p> <p>Secondary method:</p>			<p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>Crankshaft Torque</p> <p>DTC's Passed</p> <p>=====</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>only enabled when airflow is above 22.0 grams/sec.</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to <b>Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests</b> for additional info. &lt; 75.0 Nm</p> <p>P2270 (and P2272 if applicable) P013E (and P014A if applicable)</p> <p>=====</p>		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This fault is set if the secondary O2 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	<p>The P013B diagnostic is the sixth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor has a slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.</p> <p>Note: The Primary method is used when the secondary O2 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P013B diagnostic measures the secondary O2 sensor voltage response rate</p>	<p>Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.28 coefficient.</p> <p>OR</p> <p>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)</p>	<p>&gt; 8.0 units ≤ 7.2 units</p> <p>&gt; 200 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 600 mvolts)</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013E, P013F, P2270 or P2271</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	<p>Type A, 1 Trips EWMA</p>

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized integral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013B is set when the EWMA value exceeds the EWMA threshold.</p> <p>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.</p> <p>Secondary method:</p>			<p>Green Cat System Condition</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>DTC's Passed</p> <p>=====</p> <p>After above conditions are met: Fuel Enrich mode continued.</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</p> <p>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to <b>Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests</b> for additional info.</p> <p>P2270 P013E P013A P2271 P013F</p> <p>=====</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This fault is set if the secondary O2 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			<p>=====</p> <p>During this test the following must stay TRUE or the test will abort:  <math>0.950 \leq \text{Base Commanded EQR} \leq 1.100</math></p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>80 gps</p> <p><math>\leq 15.0 \text{ gps}</math></p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	<p>The P013E diagnostic is the second in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.</p> <p>This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.</p>	<p>Post O2 sensor voltage</p> <p>AND</p> <p>The Accumulated mass air flow monitored during the Delayed Response Test under DFCO</p> <p>DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is</p>	<p>&gt; 450 mvolts</p> <p>&gt; 70 grams</p> <p>&gt; 1 secs</p> <p>≥ 7.0 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013B, P013F, P2270 or P2271</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>Crankshaft Torque</p> <p>DTC's Passed</p> <p>Number of fueled cylinders =====</p> <p>After above conditions are met: DFCO mode entered (wo driver initiated pedal input).</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to <b>Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests</b> for additional info. &lt; 75.0 Nm</p> <p>P2270</p> <p>≤ 3 cylinders =====</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	<p>The P013F diagnostic is the fifth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.</p> <p>This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.</p>	<p>Post O2 sensor voltage</p> <p>AND</p> <p>The Accumulated mass air flow monitored during the Delayed Response Test</p>	<p>&lt; 350 mvolts</p> <p>&gt; 200 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013B, P013E, P2270 or P2271</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Green Cat System Condition</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>DTC's Passed</p> <p>Number of fueled cylinders</p> <p>=====</p> <p>After above conditions are met: Fuel Enrich mode</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</p> <p>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to <b>Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests</b> for additional info.</p> <p>P2270 P013E P013A P2271</p> <p>≥ 1 cylinders</p> <p>=====</p>		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>entered.</p> <p>=====</p> <p>During this test the following must stay TRUE or the test will abort:  <math>0.950 \leq \text{Base Commanded EQR} \leq 1.100</math></p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>80 gps</p> <p><math>\leq 15.0 \text{ gps}</math></p>		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	<p>This DTC determines if the O2 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.</p> <p>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.</p>	Heater Current outside of the expected range of	0.3 > amps > 2.5	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>Heater Warm-up delay</p> <p>O2S Heater device control</p> <p>B1S1 O2S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>&gt; 11.0 Volts</p> <p>= Complete</p> <p>= Not active</p> <p>&gt; zero</p> <p>&gt; 120 seconds</p>	<p>8 failures out of 10 samples</p> <p>Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate.</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use with WRAF	P015A	<p>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 O2 monitor rich to lean tests (P013E / P013A / P2271), which commands fuel cut off.</p> <p>Note: The Primary method is used when the primary WRAF O2 sensor signal transitions from above to below the O2 measured EQR threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P015A diagnostic measures the primary WRAF O2 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 air flow rate, engine speed, Baro,</p>	<p>Primary method: The EWMA of the Pre O2 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the WRAF O2 sensor measured EQR is</p> <p>OR</p> <p>Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test.</p> <p>AND</p> <p>Pre WRAF O2 sensor measured EQR is</p>	<p>&gt; 0.57 EWMA (sec) ≤ 0.50 EWMA (sec)</p> <p>&lt; 0.800 EQR</p> <p>≥ 2.5 Seconds</p> <p>&gt; 0.300 EQR</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p>	<p>TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271</p> <p>&gt; 11.0 Volts = Not active = Not active = Not active = Not active</p> <p>= False</p> <p>= False</p>	<p>Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponsesActive = TRUE, multiple tests per trip are allowed</p>	<p>Type A, 1 Trips EWMA</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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.</p> <p><u>Secondary method:</u> This fault is set if the primary WRAF O2 sensor does not achieve the required lower measured EQR</p>			<p>Green O2S Condition</p> <p>O2 Heater (pre sensor) on for</p> <p>Engine Coolant ( Or OBD Coolant Enable Criteria</p> <p>IAT</p> <p>Engine run Accum</p> <p>Engine Speed to initially enable test</p> <p>Engine Speed range to keep test enabled (after initially enabled)</p> <p>Engine Airflow</p> <p>Vehicle Speed to initially enable test</p> <p>Vehicle Speed range to keep test enabled (after initially enabled)</p> <p>Closed loop integral</p> <p>Closed Loop Active</p>	<p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than</p> <p><b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b></p> <p>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>≥ 30 seconds</p> <p>&gt; 50 °C</p> <p>= TRUE )</p> <p>&gt; -40 °C</p> <p>&gt; 30 seconds</p> <p>1,100 ≤ RPM ≤ 3,000</p> <p>1,000 ≤ RPM ≤ 3,100</p> <p>2.0 ≤ gps ≤ 20.0</p> <p>34.2 ≤ MPH ≤ 80.8</p> <p>31.1 ≤ MPH ≤ 87.0</p> <p>0.80 ≤ C/L Int ≤ 1.08</p> <p>= TRUE</p> <p>(Please see "<b>Closed Loop Enable</b>")</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		threshold before a delay time threshold is reached.			<p>Evap</p> <p>Ethanol Estimation in Progress</p> <p>Baro Post fuel cell</p> <p>EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State</p> <p>=====</p> <p>All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested.</p> <p>=====</p> <p>Pre O2S EQR B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders</p> <p>=====</p> <p>After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).</p>	<p><b>Clarification</b>" in Supporting Tables). not in control of purge</p> <p>= Not Active (Please see "<b>Ethanol Estimation in Progress</b>" in Supporting Tables).</p> <p>&gt; 70 kpa = enabled</p> <p>= not active</p> <p>= not active</p> <p>≥ 60.0 sec 500 ≤ °C ≤ 800 = DFCO possible</p> <p>=====</p> <p>=====</p> <p>≥ 1.175 EQR = DFCO active</p> <p>≤ 3 cylinders</p> <p>=====</p> <p>=====</p>		



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use with WRAF	P015B	<p>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 O2 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment.</p> <p>Note: The Primary method is used when the primary WRAF O2 sensor signal transitions from lean condition to above the O2 measured EQR threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P015B diagnostic measures the primary WRAF O2 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in</p>	<p>Primary method: The EWMA of the Pre O2 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient.</p> <p>OR</p> <p>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.</p> <p>AND</p> <p>Pre WRAF O2 sensor measured EQR is</p> <p>OR</p> <p>At end of Cat Rich stage the Pre WRAF O2 sensor measured EQR is</p>	<p>&gt; 0.68 EWMA (sec) ≤ 0.60 EWMA (sec)</p> <p>≥ 2.0 Seconds</p> <p>&lt; 0.800 EQR</p> <p>&lt; 1.175 EQR</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>P015A test is complete and</p> <p>System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control</p> <p>Low Fuel Condition</p>	<p>TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271</p> <p>= Passed</p> <p>&gt; 11.0 Volts = Not active = Not active = Not active = Not active</p> <p>= False</p>	<p>Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponsesActive = TRUE, multiple tests per trip are allowed</p>	<p>Type A, 1 Trips EWMA</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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.</p> <p><u>Secondary method:</u> This fault is set if the primary WRAF O2 sensor does not achieve the required higher measured EQR threshold before a delay time threshold is</p>			<p>Only when FuelLevelDataFault</p> <p>Green O2S Condition</p> <p>O2 Heater (pre sensor) on for</p> <p>Engine Coolant ( Or OBD Coolant Enable Criteria</p> <p>IAT Engine run Accum</p> <p>Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)</p> <p>Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)</p>	<p>= False</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>≥ 30 seconds</p> <p>&gt; 50 °C</p> <p>= TRUE )</p> <p>&gt; -40 °C &gt; 30 seconds</p> <p>1,100 ≤ RPM ≤ 3,000</p> <p>1,000 ≤ RPM ≤ 3,100</p> <p>2.0 ≤ gps ≤ 20.0</p> <p>34.2 ≤ MPH ≤ 80.8</p> <p>31.1 ≤ MPH ≤ 87.0</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		reached.			<p>Closed loop integral Closed Loop Active</p> <p>Evap</p> <p>Ethanol Estimation in Progress</p> <p>Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on time</p> <p>Predicted Catalyst temp Fuel State Number of fueled cylinders</p> <p>=====</p> <p>When above conditions are met: Fuel Enrich mode is entered.</p> <p>=====</p> <p>During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :</p>	<p><math>0.80 \leq C/L \text{ Int} \leq 1.08</math> = TRUE (Please see “<b>Closed Loop Enable Clarification</b>” in Supporting Tables).</p> <p>not in control of purge</p> <p>= Not Active (Please see “<b>Ethanol Estimation in Progress</b>” in Supporting Tables).</p> <p>&gt; 70 kpa = enabled = not active = not active <math>\geq 60.0 \text{ sec}</math></p> <p><math>500 \leq ^\circ\text{C} \leq 800</math> = DFCO inhibit <math>\geq 1 \text{ cylinders}</math></p> <p>=====</p> <p>=====</p> <p><math>0 \leq \text{gps} \leq 30</math> <math>\leq 30.0 \text{ gps}</math></p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 1	P0171	<p>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 &gt; 1.0 indicate a Lean condition.</p> <p>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.</p>	<p>The filtered long-term fuel trim metric</p> <p>AND</p> <p>The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)</p>	<p>&gt;= 1.350</p> <p>&gt;= 0.100</p> <p>If a fault has been detected the long-term fuel trim metric must be &lt; 1.300 and the short-term fuel trim metric must be &lt; 2.000 to repass the diagnostic.</p>	<p>The primary fuel trim diagnostic is enabled</p> <p>Engine speed BARO Coolant Temp</p> <p>Coolant Temp MAP Inlet Air Temp MAF Fuel Level</p> <p>Long Term Fuel Trim data accumulation:</p> <p>Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis</p>	<p>400 &lt;rpm&lt; 6,500 &gt; 70 kPa &gt; -20 °C (or OBD Coolant Enable Criteria = TRUE) &lt; 135 °C 18 &lt;kPa&lt; 255 -20 &lt;°C&lt; 150 1 &lt;g/s&lt; 1,000 &gt; 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.</p> <p>&gt; 30.00 seconds of data must accumulate on each trip, with at least 15.00 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's for startability reasons. See <b>Startup Engine Coolant adjustment to Minimum accumulation time</b></p> <p>(Please see <b>P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage</b> in Supporting Tables for a list of cells utilized for diagnosis)</p>	<p>Frequency: 100 ms Continuous Loop</p>	<p>Type B, 2 Trips</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Closed Loop Long Term FT</p> <p>EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.</p> <p>No active DTC:</p>	<p>Enabled Enabled (Please see "<b>Closed Loop Enable Clarification</b>" and "<b>Long Term FT Enable Criteria</b>" in Supporting Tables.)</p> <p>Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active</p> <p>IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR_System FA EvapExcessPurgePsbl_F A Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_F A EGRValvePerformance_F A EGRValveCircuit_FA MAP_EngineVacuumStat us AmbPresDfIttdStatus TC_BoostPresSnsrFA O2S_Bank_1_Sensor_1_ FA</p>		

## 21OBDG03D ECM Summary Tables

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## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.</p> <p>Once purge is enabled if the filtered Purge Long Term Fuel Trim metric &gt; 0.715, 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 &lt;= 0.715, 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 2 out of 3 intrusive segments, the filtered Purge Long Term Fuel Trim metric &lt;= 0.710 the fault will set.</p> <p>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</p>		<p>term fuel trim metric must be &gt; 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values &lt; 0.71 until the diagnostic repasses after a failure.</p>		<p>If the accumulated purge volume is &gt; 1,400.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is &gt; 24.5 %.</p>	<p>time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric &gt; 0.715 for at least 150.00 seconds, indicating that the canister has been purged.</p>	

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 3 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.						



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	<p>This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	< 145	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending on</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)</p> <p>SENT Internal Error Fault Pending (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)</p>	<p>50.00 failures out of 62.00 samples</p> <p>100 ms per Sample</p> <p>Continuous</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	<p>This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)</p> <p>SENT Internal Error Fault Pending (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)</p>	<p>50.00 failures out of 62.00 samples 100 ms per Sample Continuous</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	<p>This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)</p> <p>SENT Internal Error Fault Pending (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)</p>	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	<p>This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Internal Error Fault Active (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)</p> <p>SENT Internal Error Fault Pending (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)</p>	<p>50.00 failures out of 62.00 samples 100 ms per Sample Continuous</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	<p>This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test ( as follows)</p> <p>a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time ( min or max duty cycle) &gt;= 5 sec</p> <p>Or 2] Fuel Pres Err Variance &lt;= calibration value KeFDBR_cmp_FPSS_MinPres</p> <p>Variance ; Otherwise, Report status as Pass</p> <p>b] Intrusive test freq limit: 60 sec between intrusive tests that pass,</p> <p>c] Intrusive test Fuel Flow limit: Fuel Flow Actual &lt; Max allowed Fuel Flow rate</p>						Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low  Values are analyzed as percent of sensor reference voltage $[(\text{Abs} [5.0\text{V} - \text{SensorVoltsActual}] / 5.0\text{V}) * 100\%]$	Fuel Pressure Sensor output %  [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]  b) Run_Crank Active [PMDR_b_RunCrankActiv e]  c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]  d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]	a) == TRUE  b) == TRUE  c) <> TRUE  d1) IF calibration CeFDBR_e_WiredTo_FT ZM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures / 80.00 samples  1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output %  [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]  b) Run_Crank Active [PMDR_b_RunCrankActiv e]  c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]  d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]  d2) Sensor Bus Relay On  d3) CAN Sensor Bus message \$0C3_Available  d4) Fuel Pres Sensor Ref	a) == TRUE  b) == TRUE  c) <> TRUE  d1) IF calibration CeFDBR_e_WiredTo_FT ZM == WiredTo FTZM  d2) == TRUE  d3) == TRUE  d4) <> TRUE	64.00 failures / 80.00 samples  1 sample/12.5 ms	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FT ZM <> WiredTo FTZM, then see Case1		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High  Values are analyzed as percent of sensor reference voltage $[(\text{Abs } [5.0\text{V} - \text{SensorVoltsActual}] / 5.0\text{V}) * 100\%]$	Fuel Pressure Sensor output %  [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl]  b) Run_Crank Active [PMDR_b_RunCrankActive]  c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]  d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE  b) == TRUE  c) <> TRUE  d1) IF calibration CeFDBR_e_WiredTo_FT ZM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures / 80.00 samples  1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output %  [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl]  b) Run_Crank Active [PMDR_b_RunCrankActive]  c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]  d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]  d2) Sensor Bus Relay On  d3) CAN Sensor Bus message \$0C3_Available  d4) Fuel Pres Sensor Ref	a) == TRUE  b) == TRUE  c) <> TRUE  d1) IF calibration CeFDBR_e_WiredTo_FT ZM == WiredTo FTZM  d2) == TRUE  d3) == TRUE  d4) <> TRUE	64.00 failures / 80.00 samples  1 sample/12.5 ms	



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FT ZM <> WiredTo FTZM, then see Case1		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT SIDI High Pressure Sensor Performance	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensor1) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	<p>Primary sensor (P1) vs. Secondary sensor (P2) performance rationality</p> <p>((Low Limit fail Filtered Fuel Control Error )</p> <p>OR</p> <p>(High Limit Fail: Filtered Fuel Control Error))</p> <p>AND</p> <p>(Filtered Absolute delta between sensor1 and sensor2</p>	<p>&lt;=</p> <p><b>P0191 - Low fail limit of fuel control due to pressure sensor skewed low</b></p> <p>(See supporting table)</p> <p>&gt;=</p> <p><b>P0191 - High fail limit of fuel control due to high pressure sensor skewed High</b></p> <p>(see Supporting table)</p> <p>&gt;= 1.00 mpa</p> <p>Note: fuel control error is calculated based on the squareroot of sensor1 divided by sensor2, this value is filter to ensure proper failure detection.</p> <p>Absolute delta between sensor1 and sensor2 value is filter to ensure proper failure detection.</p>	<p>Commanded Pressure rate of change (increasing or decreasing)</p> <p>for a period of time</p>	<p>&lt; 0.70 mpa</p> <p>&gt;= 1.25 seconds</p> <p>Enabled when a code clear is not active or not exiting device control</p>	<p>Filter Fuel Control Error term and Absolute delta between sensor1 and sensor2 exceed Low or High Fail limit for a duration &gt;= 1.50 seconds</p> <p>This is diagnostic runs Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	<p>This DTC diagnose SENT high pressure sensor 1 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	High Pressure Rail Sensor 1 SENT digital read value	=< 66			Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Engine Run Time  OR  ECT	Enabled  > 20.0 seconds   >= -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<b>Continuous Test</b>  <u>Pass/Fail Condition:</u>  Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length ≥ 10.00 °C	None	Enabled	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature Sensor B Circuit Low	P01BB	Controller specific output driver circuit diagnoses the Engine Oil Temperature Sensor B 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 B Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature Sensor B Circuit High	P01BC	Controller specific output driver circuit diagnoses the Engine Oil Temperature Sensor B 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 B Circuit Resistance	> 450,000 ohms	Diagnostic Status  Engine Run Time  OR  ECT	Enabled  > 20.0 seconds  >= -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature Sensor B Circuit Intermittent	P01BD	Determines if an intermittent fault exists on the engine oil temperature sensor B circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period.	<b>Continuous Test</b>  <u>Pass/Fail Condition:</u>  Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length >= 10.00 °C	None	Enabled  AND  EngOilTempFA = FALSE	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 3 Circuit Low	P01E5	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr3  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 3 Circuit High	P01E6	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 3 Circuit Intermittent/ Erratic	P01E7	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr3</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_TS3_Erratic_TFTK O</p> <p>EECR_TS3_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6  The calculated high and low limits for the next reading use the following calibrations:  Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	    10.0 seconds -60.0 °C 150.0 °C  10.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  7.0 seconds -60.0 °C 150.0 °C				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature - ATM	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	60.0 °C	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Engine Runtime Distance traveled this key cycle</p> <p>Ambient air pressure</p> <p>Ambient air temperature</p> <p>*****</p> <p>Engine coolant temperature</p> <p>At least once during the key cycle</p> <p>Type 0 (non-heated t-stat)</p> <p>*****</p> <p>Heat to coolant</p> <p>DFCO time</p> <p>Thermostat duty cycle</p> <p>RPM</p> <p>Active Fuel Management is not in</p>	<p>ECT_Sensor_Ckt_FA</p> <p>VehicleSpeedSensor_FA</p> <p>OAT_PtEstFiltFA</p> <p>THMR_AWP_AuxPumpFA</p> <p>THMR_AHV_FA</p> <p>THMR_SWP_Control_FA</p> <p>EngineTorqueEstInaccuracy</p> <p>ECT_Sensor_Perf_FA</p> <p>THMR_SWP_NoFlow_FA</p> <p>THMR_SWP_FlowStuckOn_FA</p> <p>≥ 30.0 seconds</p> <p>≥ 1.0 km</p> <p>≥ 55.0 kPa</p> <p>≥ -9.0 °C</p> <p>≥ 71.0 °C</p> <p>≥</p> <p><b>P01F0 - Heat To Coolant Min 2D</b></p> <p>≤ 12.0 seconds</p> <p>≤ 101.0 %</p> <p>≤ 9,999</p> <p>Half Cylinder Mode</p>	48 seconds out of a 60 seconds window	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit - (SIDI)	P0201	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p><math>\geq 200</math> KOhms impedance between signal and controller ground</p> <p><math>\geq 200</math> KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p><math>\geq 11</math> Volts <math>\geq 1</math> Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit - (SIDI)	P0202	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p>&gt;= 200 KOhms impedance between signal and controller ground</p> <p>&gt;= 200 KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit - (SIDI)	P0203	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p><math>\geq 200</math> KOhms impedance between signal and controller ground</p> <p><math>\geq 200</math> KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p><math>\geq 11</math> Volts</p> <p><math>\geq 1</math> Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit - (SIDI)	P0204	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p><math>\geq 200</math> KOhms impedance between signal and controller ground</p> <p><math>\geq 200</math> KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p><math>\geq 11</math> Volts <math>\geq 1</math> Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 <	0.250 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	79 / 159 counts;  57 counts continuous;  3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	4.590 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	79 / 159 counts;  57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure (TIAP) Sensor Performance (single turbo)	P0236	<p>Detects a performance failure in the Turbocharger Boost Pressure sensor, such as when a Turbocharger Boost Pressure value is stuck in range.</p> <p>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, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS).</p> <p>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 Turbocharger Boost</p>	<p><b>Engine Running:</b></p> <p>See table <b>P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</b> for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND</p>	<p>&gt; 20.0 grams/sec</p> <p>&gt; 25.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 250 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>&gt;= 400 RPM &lt;= 6,200 RPM</p> <p>&gt;= -9 Deg C</p> <p>= TRUE)</p> <p>&lt;= 130 Deg C</p> <p>= FALSE)</p> <p>&gt;= -20 Deg C &lt;= 100 Deg C</p> <p>&gt;= 0.50</p> <p>Modeled Air Flow Error multiplied by <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM</b> and <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est</b></p> <p>MAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</b></p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Pressure sensor. In this case, the Turbocharger Boost Pressure Performance diagnostic will fail.	<p>Measured TIAP - measured MAP - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</b></p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</b></p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 1.0 seconds</p> <p>&gt; 1.0 seconds</p> <p>&gt; a threshold in gm/sec as a function of engine speed See table</p>	<p>No Active DTCs:</p> <p>No Pending DTCs:</p>	<p>MAP Model 2 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</b></p> <p>MAP Model 3 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</b></p> <p>TIAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</b></p> <p>Filtered Throttle Model Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</b></p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p><b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min Air Flow</b></p> <p>&gt; a threshold in kPa as a function of engine speed See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</b></p> <p>&lt; 3.0 gm/sec</p> <p>&lt; a threshold in gm/ sec as a function of engine speed See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</b></p> <p>&lt; a threshold in kPa as a function of engine speed See table</p> <p><b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</b></p> <p>&lt; 3.0 gm/sec</p>	Diagnostic is Enabled	MnfdTempSensorCktFP		



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharge r Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to ground in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too low. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	< 14.4 % of 5 Volt Range (This is equal to 50.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples  1 sample every 12.5 msec	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharge r Boost Pressure Sensor Circuit High	P0238	Detects a continuous short to power or open circuit in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too high. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	> 85.8 % of 5 Volt Range (This is equal to 371.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples  1 sample every 12.5 msec	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharge r Wastegate / Supercharge r Boost Solenoid A Control Circuit Low	P0245	<p>Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' 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.</p> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	<p>≤ 0.5 Ω impedance between output and controller ground</p>	<p>Diagnostic enabled *****</p> <p>Powertrain relay voltage</p> <p>Ignition run crank voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>≥ 11.0 Volts</p> <p>&gt; 5.00 Volts *****</p>	<p>10 failures out of 12 samples</p> <p>100ms / sample</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controllers P0243 may also set turbocharger wastegate / supercharger boost solenoid A control circuit</p>

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharge r Wastegate / Supercharge r Boost Solenoid A Control Circuit High	P0246	<p>Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' 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.</p> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	<p>≤ 0.5 Ω impedance between output and controller power</p>	<p>Diagnostic enabled *****</p> <p>Powertrain relay voltage</p> <p>Ignition run crank voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>≥ 11.0 Volts</p> <p>&gt; 5.00 Volts *****</p>	<p>10 failures out of 12 samples</p> <p>100ms / sample</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	25 amp >= through low side driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	25 amp >= through low side driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Engine Underboost  Wastegate Position Deviation; Turbocharge r with electronic wastegate.	P0299	This DTC indicates a wastegate position deviation which will lead into an underboost situation.	Wastegate Position deviation Error = (Expected Wastegate Position - Actual Wastegate Position)	< refer to <b>P0299: WG negative deviation fail threshold over engine speed and desired torque.</b> + <b>P0299: Additive offset on WG negative deviation ambient correction.</b> in Supporting tables.	Dev. Diagnostic enable ***** Coolant temperature or OBD Coolant Enable Criteria and Coolant temperature and not OBD Max Coolant Achived ***** Engine speed     ***** Desired Torque     ***** Desired Torque derivative in range  Actual wastegate position in range  Actual wastegate position derivative in range ***** All conditions haveto be fullfilled for:	True ***** > -40.0 °C  < 150.0 °C  ***** > refer to <b>P0234 P0299: Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis.</b> in Supporting tables. ***** > refer to <b>P0234 P0299: Desired torque minimum limit over Ambient pressure to enable the WG deviation diagnosis.</b> in Supporting tables ***** > -30.00 Nm/sec < 30.00 Nm/sec  > 40.00 % < 100.00 %  > -15.00 %/sec < 15.00 %/sec ***** > refer to	25 failures out of 30 samples  100ms / sample	Type A, 1 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>No active DTCs:</p> <p>*****</p> <p>No device control active for compressor recirculation valve.</p>	<p><b>P0234 P0299: Wastegate position deviation diagnostic enable delay as a function of engine speed and ambient pressure</b> in Supporting table *****</p> <p>WGAR_b_WG_CktFA NaWGAR_b_PstnCntrlFA CRAR_b_CRV_CktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnrFA AmbientAirDefault *****</p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude</b> (See supporting table)</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude</b> (See supporting table)</p> <p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time</b> (See supporting table)</p> <p>&gt;=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</b></p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude</b> (See supporting table)</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude</b> (See supporting table)</p> <p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time</b> (See supporting table)</p> <p>&gt;=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</b></p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude</b> (See supporting table)</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude</b> (See supporting table)</p> <p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time</b> (See supporting table)</p> <p>&gt;=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</b></p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude</b> (See supporting table)</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude</b> (See supporting table)</p> <p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time</b> (See supporting table)</p> <p>&gt;=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</b></p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected	P0300	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.  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  Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load		Engine Run Time	> 2 crankshaft revolution	Emission Exceedence = any ( 5 ) failed 200 rev blocks out of ( 16 ) 200 rev block tests  Failure reported for ( 1 ) Exceedence in 1st ( 16 ) 200 rev block tests, or ( 4 ) Exceedences thereafter.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)
Cylinder 1 Misfire Detected	P0301		The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. 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 <b>Undetectable region</b> see Algorithm Description Document for additional details.		Engine Coolant Temp	"ECT" If OBD Max Coolant Achieved = FALSE -12 °C < ECT Or if OBD Max Coolant Achieved = TRUE -12 °C < ECT < 130 °C		
Cylinder 2 Misfire Detected	P0302				Or If ECT at startup Then	< -12 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 130 °C		
Cylinder 3 Misfire Detected	P0303							
Cylinder 4 Misfire Detected	P0304				System Voltage + Throttle delta - Throttle delta	9.00 < volts < 32.00 < 20.50 % per 25 ms < 20.50 % per 25 ms		
			SINGLE CYLINDER CONTINUOUS MISFIRE( (Medres_Decel Medres_Jerk  OR (Medres_Decel Medres_Jerk  OR (Lores_Decel Lores_Jerk  OR (Lores_Decel Lores_Jerk  OR RevBalanceTime )	- see details of thresholds on Supporting Tables Tab  > <b>RufSCD_Decel</b> AND > <b>RufSCD_Jerk</b> )  > <b>SCD_Decel</b> AND > <b>SCD_Jerk</b> )  > <b>RufCyl_Decel</b> AND > <b>RufCyl_Jerk</b> )  > <b>CylModeDecel</b> AND > <b>CylModeJerk</b> )  > <b>RevMode_Decel</b>	Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	Not Enabled	OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.	<p>*****</p> <p><b>**This Feature not used on Gasoline engines**</b></p> <p>Combustion Modes that force selection of Idle Tables</p> <p>*****</p> <p>Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables:</p> <p>RANDOM MISFIRE Use random misfire thresholds If no misfire for</p> <p>(Medres_Decel</p> <p>AND</p> <p>Medres_Jerk)</p> <p>OR (Medres_Decel</p> <p>AND</p> <p>Medres_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND</p> <p>Lores_Jerk)</p>	<p>*****</p> <p><b>**This Feature not used on Gasoline engines**</b></p> <p><b>CombustModelIdleTbl</b> in Supporting Tables</p> <p>*****</p> <p>&gt; 3 Engine Cycles</p> <p>&gt; <b>RufSCD_Decel * Random_SCD_Decel</b></p> <p>&gt;<b>RufSCD_Jerk * Random_SCD_Jerk</b></p> <p>&gt; <b>SCD_Decel * Random_SCD_Decel</b></p> <p>&gt; <b>SCD_Jerk * Random_SCD_Jerk</b></p> <p>&gt; <b>RufCyl_Decel * RandomCylModDecel</b></p> <p>&gt; <b>RufCyl_Jerk * RandomCylModJerk</b></p>			<p>any Catalyst Exceedence = ( 1 ) 200 rev block as data supports for catalyst damage.</p> <p>Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.</p> <p>Continuous</p>	



## 210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)</p> <p>AND Above TRUE for) )</p> <p>BANK MISFIRE Cylinders above Bank Thresholds</p> <p>(Medres_Decel</p> <p>AND Medres_Jerk)</p> <p>OR (Medres_Decel</p> <p>AND Medres_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND Lores_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND Lores_Jerk)</p>	<p>&gt; <b>CylModeDecel * PairCylModeDecel</b></p> <p>&gt; 80 engine cycles out of 100 engine cycles</p> <p>&gt;= 4 cylinders</p> <p>&gt; <b>RufSCD_Decel * Bank_SCD_Decel</b></p> <p>&gt; <b>RufSCD_Jerk * Bank_SCD_Jerk</b></p> <p>&gt; <b>SCD_Decel * Bank_SCD_Decel</b></p> <p>&gt; <b>SCD_Jerk * Bank_SCD_Jerk</b></p> <p>&gt; <b>RufCyl_Decel * BankCylModeDecel</b></p> <p>&gt; <b>RufCyl_Jerk * BankCylModeJerk</b></p> <p>&gt; <b>CylModeDecel * BankCylModeDecel</b></p> <p>&gt; <b>CylModeJerk * BankCylModeJerk</b></p>				

210BDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CYLINDER DEACTIVATION MODE (Active Fuel Managment)  AFM: SINGLE CYLINDER CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk)  OR (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk)  AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk)  (CylBeforeDeacCylDecel	$> \text{CylModeDecel} * \text{ClyAfterAFM\_Decel}$  $> \text{CylModeJerk} * \text{CylAfterAFM\_Jerk}$  $> \text{CylModeDecel} * \text{CylBeforeAFM\_Decel}$  $> \text{CylModeJerk} * \text{ClyBeforeAFM\_Jerk}$  $> 3 \text{ Engine Cycles}$  $> \text{CylModeDecel} * \text{ClyAfterAFM\_Decel} * \text{RandomAFM\_Decel}$  $> \text{CylModeJerk} * \text{CylAfterAFM\_Jerk} * \text{RandomAFM\_Jerk}$  $> \text{CylModeDecel} * \text{CylBeforeAFM\_Decel} * \text{RandomAFM\_Decel}$				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND CylBeforeDeacCyl_Jerk)</p> <p>OR IF option Crank based IMEP estimate is Enabled and CrankBased_IMEP is</p> <p>Misfire Percent Emission Failure Threshold</p>	<p>&gt; CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk</p> <p>IMEP Enabled</p> <p>&lt; 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</p> <p>- see details on Supporting Tables Tab</p> <p>≥ 2.63 % P0300</p>				

## 21OBDG03D ECM Summary Tables

[illegible]

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfItDStatus		
					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	<b>Undetectable region</b> from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 7,200 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< <b>ZeroTorqueEngLoad</b> or < <b>ZeroTorqueAFM</b> if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	≤ 1.3 % (≤ 1.3 % in AFM) > 22 mph (> 22 mph AFM)	4 cycle delay	

## 210BDG03D ECM Summary Tables

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



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Driver cranks before Wait to Start lamp extinguishes</p> <p>Brake Torque *****</p> <p>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:</p> <p>Stop filter early:</p> <p>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). )</p> <p>Used Off Idle, and while not shifting,</p> <p>TPS Engine Speed Veh Speed Auto Transmission</p> <p>individual candidate deemed abnormal if number of consecutive decelerating</p>	<p>IF TRUE</p> <p>&gt; 199.99 % Max Torque *****</p> <p>&gt; "Ring Filter" # of engine cycles after misfire in Supporting Tables</p> <p>&gt; "Number of Normals" # of engine cycles after misfire in Supporting Tables tab</p> <p>&gt; 0 % &gt; 900 rpm &gt; 3 mph not shifting</p>	<p><b>WaitToStart</b> cycle delay</p> <p>0 cycle delay *****</p>	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode</p> <p>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.</p> <p>abnormal candidates/ total candidates</p> <p>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). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles.</p>	<p>&gt; <b>Abnormal SCD Mode</b> &gt; <b>Abnormal Cyl Mode</b> &gt; <b>Abnormal Rev Mode</b> in Supporting Tables</p> <p>&gt; 0.50 ratio</p>	discard 100 engine cycle test	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages</p> <p>Pattern Recog Enabled:</p> <p>Pattern Recog Enabled during Cylinder Deac</p> <p>Pattern Recog Enabled consecutive cyl patrn</p> <p>Engine Speed Veh Speed</p> <p>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.</p> <p>(CylAfter_Accel AND CylAfter_Jerk)</p> <p>Additionally, the crankhaft is checked again a small</p>	<p>Enabled</p> <p>Not Enabled</p> <p>Disabled</p> <p>1,100 &lt; rpm &lt; 6,100 &gt; 3.1 mph</p> <p>&gt; Misfire_decel * <b>1st_FireAfrMisfr_Acel</b></p> <p>&gt; Misfire_Jerk * <b>1st_FireAfrMisfr_Jerk</b></p> <p>Or if AFM mode is active: &gt; Misfire_decel * <b>1stFireAfrMisAcelAFM</b> &gt; Misfire_Jerk * <b>1stFireAfterMisJerkAFM</b></p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>calibratable number of cylinders later to see if the disturbance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk 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.</p> <p>Num of Cylinders after misfire to start check of crankshaft snap</p> <p>"misfire" recognized if: Crankshaft snap after: isolated "misfire"</p> <p>repetative "misfire"</p> <p>At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.</p> <p>Ratio of Unrecog/Recog</p>	<p>2 Cylinders</p> <p>&lt; Misfire_Jerk * <b>SnapDecayAfterMisfire</b></p> <p>&lt; Misfire_Jerk * <b>SnapDecayAfterMisfire * RepetSnapDecayAdjst</b> in Supporting Tables</p> <p>&gt; 1.00</p>	discard 100 engine cycle test	

## 210BDG03D ECM Summary Tables

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

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>AND No Active DTCs</p> <p>*****</p> <p>Default Action</p> <p>*****</p> <p>Isolator Resonance Default Action Option</p> <p>*****</p> <p>If Isolator Resonance Option Enabled</p> <p>AND Misfire P030x TFTKO</p>	<p>Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)</p> <p>*****</p> <p>Not Enabled</p> <p>*****</p> <p>Set engine speed limits: 0 &lt; Eng RPM &lt; 9,000</p>	<p>4 cycle delay</p> <p>*****</p> <p>*****</p>	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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°.	<p>The Crankshaft target wheel should be 360 degrees around in circumference. Loss or controller non-volatile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect.</p> <p>Set the DTC if the Difference between the sum of the reluctor wheel's teeth and 360 degrees is greater than:</p>	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds  Frequency Continuous100 msec	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> <b>P0324_PerCyl_ExcessiveKnock_Threshold</b> (no units)	Diagnostic Enabled?  Engine Run Time  Engine Speed   Engine Air Flow   Engine Coolant Temperature  or OBD Coolant Enable Criteria  Inlet Air Temperature   Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes  ≥ 0.0 seconds  ≥ 650 RPM AND ≤ 8,500 RPM  ≥ 0 mg/cylinder AND ≤ 2,000 mg/cylinder  ≥ -40 deg's C  = TRUE  ≥ -40 deg's C   ≥ 110 revs	First Order Lag Filters with Weight Coefficient = 0.0260  Updated each engine event	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	<p>This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used:</p> <p><b>1. 20 kHz Method:</b> 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 propagate 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: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B. High output for an Open Circuit (because</p>	<p>Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise):</p> <p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>= <b>P0325_P0330_OpenMethod_2</b></p> <p><b>Case 1 (20 kHz Method):</b> &gt; <b>P0325_P0330_OpenCktThrshMin (20 kHz)</b> AND &lt; <b>P0325_P0330_OpenCktThrshMax (20 kHz)</b></p> <p><b>Case 2 (Normal Noise Method):</b> &gt; <b>P0325_P0330_OpenCktThrshMin (Normal Noise)</b> AND &lt; <b>P0325_P0330_OpenCktThrshMax (Normal Noise)</b></p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p>	<p>Yes</p> <p>≥ 0.0 seconds</p> <p>≥ 650 RPM and ≤ 8,500 RPM</p> <p>≥ 300 revs</p> <p>≥ 70 mg/cylinder and ≤ 2,000 mg/cylinder</p> <p>≥ -40 deg's C</p> <p>= TRUE</p> <p>≥ -40 deg's C</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p>Weight Coefficient = 0.0065</p> <p>Updated each engine event</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>the 20 kHz injected signal is detected only on one of the sensor inputs).</p> <p>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.</p> <p><b>2. Normal Noise:</b> 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.</p> <p>See Supporting Tables for method definition: <b>P0325 P0330 OpenM</b></p>						

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p><b>ethod</b> defines which of the two diagnostic methods is used as a function of engine speed (RPM). Typical implementations:</p> <ul style="list-style-type: none"> <li>A. Use 20 kHz method at all engine RPM (used when acceptable separation achieved at all RPM) or</li> <li>B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM</li> </ul>						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Filtered FFT Intensity</p> <p>(where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency)</p> <p>Filtered FFT Intensity</p>	<p><b>Case 1: Engine <u>not</u> in AFM mode</b></p> <p>&lt;</p> <p><b>P0326_P0331_AbnormalNoise_Threshold</b> (Supporting Table)</p> <p>OR</p> <p><b>Case 2: Engine <u>is</u> in AFM mode</b></p> <p>&lt;</p> <p><b>P0326_P0331_AbnormalNoise_Thresh_AFM</b> (Supporting Table; Engine <u>is</u> in AFM mode)</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p> <p>Individual Cylinders enabled for Abnormal Noise</p> <p>Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)</p>	<p>Yes</p> <p>≥ 0.0 seconds</p> <p>≥ 2,500 RPM (not in AFM mode) OR ≥ 2,000 (in AFM mode)</p> <p>AND ≤ 8,500 RPM</p> <p>≥ 70 mg/cylinder AND ≤ 2,000 mg/cylinder</p> <p>≥ -40 deg's C</p> <p>= TRUE</p> <p>≥ -40 deg's C</p> <p><b>P0326_P0331_AbnormalNoise_CylsEnabled</b> (Supporting Table)</p> <p>≥ 600 Revs</p>	<p>First Order Lag Filters with Weight Coefficient =</p> <p>0.0200</p> <p>Updated each engine event</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  (of 5.0 Volt reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  (of 5 Volt Reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 2	P0330	<p>This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2</p> <p>There are two possible methods used:</p> <p><b>1. 20 kHz Method:</b> 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 propagate 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:</p> <p>A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B. High output for an</p>	<p><b>Individual Sensor Thresholds Enabled?</b></p> <p><b>Open Circuit Method chosen</b> (2 possible methods: 20 kHz or Normal Noise):</p> <p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>= 1.00 , 2.00</p> <p>=OpenMethod_2 (supporting table)</p> <p><b>Case 1 (20 kHz Method):</b></p> <p>&gt; <b>OpenCktThrshMin (20 kHz)</b> AND &lt; <b>OpenCktThrshMax (20 kHz)</b></p> <p><b>Case 2 (Normal Noise Method):</b></p> <p>&gt; <b>OpenCktThrshMin (Normal Noise)</b> AND &lt; <b>OpenCktThrshMax (Normal Noise)</b></p> <p><b>Case 3 (20 kHz Method):</b></p> <p>&gt; <b>OpenCktThrshMin2 (20 kHz)</b> AND</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p>	<p>Yes</p> <p>≥ 0.0 seconds</p> <p>≥ 650 RPM and ≤ 8,500 RPM</p> <p>≥ 300 revs</p> <p>≥ 70 mg/cylinder and ≤ 2,000 mg/cylinder</p> <p>≥ -40 deg's C</p> <p>= TRUE</p> <p>≥ -40 deg's C</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p><b>Case 1 &amp; 2:</b> Weight Coefficient = 0.0065</p> <p>Updated each engine event</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>Open Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs).</p> <p>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.</p> <p><b>2. Normal Noise:</b> 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.</p> <p>See Supporting Tables</p>	<p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>&lt; <b>OpenCktThrshMax2 (20kHz)</b></p> <p><b>Case 4 (Normal Noise Method):</b></p> <p>&gt; <b>OpenCktThrshMin2 (NN)</b></p> <p>AND</p> <p>&lt; <b>OpenCktThrshMax2 (NN)</b></p>			<p><b>Case 3 &amp; 4</b> Weight Coefficient = 0.01</p> <p>Updated each engine event</p>	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>for method definition:  <b>P0325_P0330_OpenM  ethod</b> defines which of  the two diagnostic  methods is used as a  fuction of engine  speed (RPM).  Typical  implementations:  A. Use 20 kHz  method at allengine  RPM (used when  acceptable separation  achieved at all RPM) or  B. Use 20 kHz  method at low/medium  RPM and Normal Noise  at high RPM</p> <p>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.</p>						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 2	P0331	<p>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.</p> <p>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.</p>	<p>Individual Sensor Thresholds Enabled?</p> <p>Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise)</p> <p>Filtered FFT Intensity</p>	<p>= 1.00 , 2.00</p> <p><b>Case 1: Engine <u>not</u> in AFM mode</b> &lt; <b>AbnormalNoise_Threshold</b> (Supporting Table)</p> <p>OR</p> <p><b>Case 2: Engine <u>is</u> in AFM mode</b> &lt; <b>AbnormalNoise_Threshold_AFM</b> (Supporting Table)</p> <p><b>Case 3: Engine not in AFM mode</b> &lt; <b>AbnormalLo2</b> (Supporting Table)</p> <p>OR</p> <p><b>Case 4: Engine is in AFM mode</b> &lt; <b>AbnormalLoAFM_2</b> (Supporting Table)</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p> <p>Individual Cylinders enabled for Abnormal Noise</p> <p>Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)</p>	<p>Yes ≥ 0.0 seconds</p> <p>≥ 2,500 RPM (not in AFM mode) OR ≥ 2,000 (in AFM mode)</p> <p>AND ≤ 8,500 RPM</p> <p>≥ 70 mg/cylinder AND ≤ 2,000 mg/cylinder</p> <p>≥ -40 deg's C</p> <p>= TRUE</p> <p>≥ -40 deg's C</p> <p><b>AbnormalNoise_CylsEnabled</b> (Supporting Table)</p> <p>≥ 600 Revs</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p><b>Case 1 &amp; 2:</b> Weight Coefficient = 0.0065</p> <p>Updated each engine event</p> <p><b>Case 3 &amp; 4:</b> Weight Coefficient = 0.01</p> <p>Updated each engine eventFirst</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  (of 5 Volt Reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  (of 5 Volt Reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A 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 AND (cam pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled  = FALSE  > 0.3 grams/second ) )	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running  Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged  No DTC Active:	Test is Enabled  P0365 P0366	2 failures out of 10 samples  One sample per engine revolution	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A 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 4 or more crank re-synchronizations occur	< 4.0 seconds	Engine Air Flow  Cam-based engine speed  No DTC Active:	Test is Enabled  >= 0.3 grams/second  > 60 RPM  P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running  Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled   = FALSE  > 0.3 grams/second ) )	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 pulses  > 65,535 pulses	Engine is Running OR Starter is engaged  No DTC Active:	Test is Enabled   P0365 P0366	8 failures out of 10 samples  One sample per engine revolution	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	>= 5.5 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled  = FALSE  > 0.3 grams/second ) )	Continuous every 100 msec	Type A, 1 Trips
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds				
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running  Starter is not engaged	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events  (There are 12 MEDRES events per engine cycle)  Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3  >= 0 counts	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	Test is Enabled     CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized  No DTC Active:	Test is Enabled  CrankSensor_FA	8 failures out of 10 samples  Continuous every engine cycle	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	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 12 MEDRES events is OR  (There are 12 MEDRES events per engine cycle)  Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses   = region 3 >= 0 counts	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	Test is Enabled    CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized  No DTC Active:	Test is Enabled   CrankSensor_FA	8 failures out of 10 samples  Continuous every engine cycle	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 2 crankshaft teeth	Engine has started rotating during a hybrid auto-start  Crankshaft position is being verified  No Active DTCs:	Test is Enabled   CrankSensor_FA	2 failures out of 3 samples  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  Crankshaft position is being verified  No Active DTCs:	Test is Enabled   CrankSensor_FA	4 failures out of 5 samples  a sample occurs each hybrid auto-start	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  within a period of time	>= 3 pulses  <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow  Engine Movement Detected  No Active DTCs:	Test is Enabled  > 400 RPM < 2,000 RPM >= 0.3 grams/second   CrankSensor_FA	Continuous  Every 250 msec	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 30 \text{ k}\Omega$ impedance between signal and controller ground	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures  out of 25 Samples  100 msec rate	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 30 \text{ k}\Omega$ impedance between signal and controller ground	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures  out of 25 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 30 \text{ k}\Omega$ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 30 \text{ k}\Omega$ impedance between signal and controller ground	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples  100 msec rate	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	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	>= 5.5 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled  = FALSE  > 0.3 grams/second ) )	Continuous every 100 msec	Type A, 1 Trips
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds				
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running  Starter is not engaged	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events  (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3  >= 0 counts	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	Test is Enabled     CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized  No DTC Active:	Test is Enabled  CrankSensor_FA	8 failures out of 10 samples  Continuous every engine cycle	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	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 12 MEDRES events is OR  (There are 12 MEDRES events per engine cycle)  Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses   = region 3  >= 0 counts	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	Test is Enabled    CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized  No DTC Active:	Test is Enabled  CrankSensor_FA	8 failures out of 10 samples  Continuous every engine cycle	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Camshaft Profile System Performance	P037C	3 Step Sliding Cam Cold Start Performance. When Cold Start Emissions Reduction is active, verifies that commanded 3 Step Sliding Cam desired state has been obtained	When Cold Start Emissions Reduction is active, the current commanded 3 Step Sliding Cam desired state is compared to the desired coldstart emissions reduction sliding cam state to determine if desired position has been obtained	Measured system state (High Lift or Low Lift)	Diagnostic is Enabled  Catalyst Warmup Enabled  Fuel delivery mode  CLO Lift Position Desired  System Voltage  Engine Running	= TRUE  = Multi Pulse  = TRUE  > 11.00 Volts  = TRUE	200.00 cylinder events out of 500.00 with incorrect system lift state	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 3 Control Circuit Open	P03EC	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 3 Control Circuit Low Voltage	P03ED	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 solenoid driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between signal and controller ground	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 3 Control Circuit High Voltage	P03EE	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnosis is Enabled</p> <p>System supply Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 3 Performance	P03EF	An unintended pin firing without controller command. Intake Camshaft Profile 3	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 3 Pin Stuck	P03F0	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 3 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 3 Circuit Open	P03F1	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 3 Circuit Low Voltage	P03F2	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 3 Circuit High Voltage	P03F3	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 3 Performance	P03F4	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 3	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	<p>NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm</p> <p>Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.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</p> <p>Normalized Ratio OSC Value Calculation Information and Definitions =</p> <p>1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time)</p> <p>2. BestFailing OSC value from a calibration</p>	<p>Normalized Ratio OSC Value</p> <p>The EWMA calculation uses a 0.11 coefficient.</p>	< 0.35	<p>Diagnostic is Enabled</p> <p>All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)</p> <p>Rapid Step Response (RSR) feature will initiate multiple tests:</p> <p>If the difference between current EWMA value and the current OSC Normalized Ratio value is</p> <p>and the current OSC Normalized Ratio value is</p> <p>Maximum number of RSR tests to detect failure when RSR is enabled.</p> <p>MAF</p> <p>Predicted catalyst temperature</p> <p>Front O2 Sensor or Front WRAF</p> <p>Rear O2 Sensor</p> <p>General Enable Criteria</p> <p>In addition to the p-codes</p>	<p>&gt; 0.70</p> <p>&lt; 0.10</p> <p>10</p> <p>&gt; 2.00 g/s &lt; 20.00 g/s</p> <p>&lt; 800 ° C</p> <p>&gt; 825.00 mV or &gt; 1.17 EQR</p> <p>&gt; 825.00 mV</p>	<p>1 test attempted per valid decel period</p> <p>Minimum of 1 test per trip</p> <p>Maximum of 3 tests per trip</p> <p>Frequency: Fueling Related : 12.5 ms</p> <p>OSC Measurements: 100 ms</p> <p>Temp Prediction: 12.5ms</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>table (based on temp and exhaust gas flow)</p> <p>3. WorstPassing OSC value (based on temp and exhaust gas flow)</p> <p>Normalized Ratio Calculation = (1-2) / (3-2)</p> <p>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.</p> <p>Refer to the <b>P0420_WorstPassingOSCTableB1</b> and <b>P0420_BestFailingOSCTableB1</b> in Supporting Tables tab for details</p> <p>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich intrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test.</p> <p>Additional conditions and their related values</p>			<p>listed under P2270, the following DTC's shall also not be set:</p> <p>For switching O2 sensors:</p> <p>For WRAF O2 sensors:</p>	<p>O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA</p> <p>WRAF_Bank_1_FA WRAF_Bank_2_FA</p> <p><b>P0420_WorstPassingOSCTableB1</b></p> <p><b>P0420_BestFailingOSCTableB1</b></p>		

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Small Leak Detected  (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - with Fuel Tank Zome Module (FTZM))	P0442	This DTC will detect a small leak ( $\geq 0.020''$ ) in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as $\geq 0.025''$ , $0.030''$ , 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 <b>P0442 EONV Pressure Threshold (Pascals)</b> in Supporting Tables). The normalized value is calculated by the following equation: $1 - (\text{peak pressure} - \text{peak vacuum}) / \text{pressure threshold}$ . The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).	> 0.60 (EWMA Fail Threshold),	Diagnostic is Enabled  Fuel Level Drive Time Drive length  (ECT  OR OBD Coolant Enable Criteria  Baro Distance since assembly plant Engine not run time before key off must be	$10\% \leq \text{Percent} \leq 90\%$ $\geq 600 \text{ seconds}$ $\geq 5.0 \text{ miles}$  $\geq 63^\circ\text{C}$  = TRUE)  $\geq 70 \text{ kPa}$ $\geq 10.0 \text{ miles}$  $\leq$ refer to <b>P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature</b> in Supporting Tables.	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips  EWMA  Average run length is 8 to 12 trips under normal condition s  Run length is 3 to 6 trips after code clear or non-volatile reset
			When EWMA is the DTC light is illuminated.  The EWMA calculation uses a 0.13 weighting coefficient.  The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	$\leq 0.35$ (EWMA Re-Pass Threshold)	Time since last complete test if normalized result and EWMA is passing  OR Time since last complete test if normalized result or EWMA is failing  Estimated Ambient Temperature (EAT) using OAT sensor at end of drive  Conditions for Estimated	$\geq 8 \text{ hours}$  $\geq 8 \text{ hours}$  $0^\circ\text{C} \leq \text{Temperature} \leq 35^\circ\text{C}$		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.			<p>Ambient Temperature Using OAT Sensor to be Valid</p> <p>*****</p> <p>1. Startup OAT is less than previous trip EAT</p> <p>OR</p> <p>2. Startup ECT - previous trip EAT</p> <p>OR</p> <p>3. Engine off time</p> <p>OR</p> <p>4. At startup, time since previous EAT valid and able to learn</p> <p>OR</p> <p>5. EAT - current OAT</p> <p>OR</p> <p>6. EAT &lt; current OAT and speed timer and current OAT - EAT</p> <p>Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows:</p> <p>vehicle speed &lt; 10 mph 10 mph &lt; speed &lt; 35 mph 35 mph &lt; speed &lt; 124 124 mph &lt; speed &lt; 124</p> <p>Speed timer can never be less than 0 seconds</p> <p>*****</p> <p>1. High Fuel Volatility</p>	<p>*****</p> <p>≤ 0 °C</p> <p>≥ 7,200 seconds</p> <p>≤ 3,600 seconds</p> <p>0 °C ≤ difference ≤ 2 °C</p> <p>≥ 240 seconds</p> <p>≤ 2 °C</p> <p>- 0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds</p> <p>*****</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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 &gt; 1,245 Pa. Please see <b>P0442 Volatility Time as a Function of Estimate of Ambient Temperature</b> in Supporting Tables.</p> <p>OR</p> <p>2. Vacuum Refueling Detected</p> <p>See P0454 Fault Code for information on vacuum refueling algorithm.</p> <p>OR</p> <p>3. Fuel Level Refueling Detected</p> <p>See P0464 Fault Code for information on fuel level refueling.</p> <p>OR</p> <p>4. Vacuum Out of Range and No Refueling</p> <p>See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for</p>	< -5		



## 21OBDG03D ECM Summary Tables

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

21OBDG03D ECM Summary Tables

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

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)  (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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between output and controller ground.	Diagnostic is Enabled  Powertrain relay voltage	Voltage $\geq 11.0$ volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips  Note: In certain controlle rs P0458 may also set (Caniste r Purge Solenoid Short to Ground)

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance  (No ELCP - Conventional EVAP Diagnostic - with purge pump - with Fuel Tank Zone Module (FTZM))	P0446	<p>This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister.</p> <p>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.</p>	<p>Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for</p> <p>Vent Restriction Test: Tank Vacuum</p> <p>for</p> <p>before Purge Volume</p> <p>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.</p>	<p>&lt; -623 Pa 60 seconds</p> <p>&gt; 1,245 Pa 60 seconds</p> <p>&gt; refer to <b>P0446 canister vent restriction test tank vacuum threshold</b> in Supporting Tables. Calibration threshold (Pa) for canister vent restriction as function (baro)</p> <p>5 seconds</p> <p>≥ refer to <b>P0446 canister vent restriction test displaced purge volume limit</b> in Supporting Tables. Calibration threshold (liters) for canister vent restriction as function (baro)</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage Startup IAT Startup ECT Barometric Pressure P146C EVAP Purge Pump System Misassembled diagnostic is not running</p> <p>No active DTCs:</p> <p>No Active DTC's TFTKO</p>	<p>10 % ≤ Percent ≤ 90 % ≥ 10.0 volts 4 °C ≤ Temperature ≤ 35 °C ≤ 35 °C ≥ 70 kPa</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA LIN Communication Fault Active</p> <p>P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF</p>	<p>Once per Cold Start</p> <p>Time is dependent on driving conditions</p> <p>Maximum time before test abort is 1,400 seconds</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P130F U18A2		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)  (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between output and controller ground	Diagnostic is Enabled  No active DTCs:	P1005 P130F U18A2	50 failures out of 63 samples  100 ms / sample	Type B, 2 Trips  Note: In certain controlle rs P0498 may also set (Vent Solenoid Short to Ground)

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Performance  (No ELCP - Conventional EVAP Diagnostic)	P0451	<p>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.</p> <p>During the EONV test, the fuel tank vacuum sensor is re-zeroed. A re-zero occurs:</p> <p>1) At the transition from the volatility phase to the pressure phase.</p> <p>2) At the transition from the pressure phase to the vacuum phase.</p> <p>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.</p> <p>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</p>	<p>The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts)</p> <p>Upper voltage threshold (voltage addition above the nominal voltage)</p> <p>Lower voltage threshold (voltage subtraction below the nominal voltage)</p> <p>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).</p> <p>When EWMA is</p> <p>the DTC light is illuminated.</p> <p>The EWMA calculation uses a 0.20 weighting coefficient.</p> <p>The DTC light can be turned off if the EWMA is</p> <p>and stays below the</p>	<p>0.2 volts</p> <p>0.2 volts</p> <p>&gt; 0.73 (EWMA Fail Threshold),</p> <p>≤ 0.40 (EWMA Re-Pass Threshold)</p>	<p>This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes</p>		<p>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.</p>	<p>Type A, 1 Trips</p> <p>EWMA</p> <p>Average run length: 6</p> <p>Run length is 2 trips after code clear or non-volatile reset</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>detected, then the results of the re-zero test are used to determine if there is a re-zero problem.</p> <p>1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0.</p> <p>2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure.</p> <p>3) A ratio of 1.0 means that the re-zero pressure did not get within the window.</p> <p>4) Re-zero pressure within the window generates values between 0.0 and 1.0.</p> <p>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.</p>	EWMA fail threshold for 3 additional consecutive trips.					



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage  (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0452	<p>This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range.</p> <p>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.</p> <p>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.</p>	<p>FTP sensor signal</p> <p>The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~3736 Pa).</p>	< 0.15 volts (3.0 % of Vref or ~ 1,495 Pa)	No active DTC's:	P1001 P1005 U18A2	<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage  (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0453	<p>This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.</p> <p>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.</p> <p>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.</p>	<p>FTP sensor signal</p> <p>The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~3736 Pa).</p>	> 4.85 volts ( 97.0 % of Vref or ~-3,985 Pa)	No active DTCs:	P1001 P1005 U18A2	<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent  (No ELCP - Conventional EVAP Diagnostic)	P0454	<p>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.</p> <p>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.</p> <p>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."</p> <p>The vacuum change rationality diagnostic is an "X out of Y" test.</p> <p>1) Each time the EONV test completes, the (Y) sample counter is incremented.</p> <p>2) Each time the</p>	<p>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</p> <p>in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of</p> <p>for 30 seconds during a 600 second refueling rationality test.</p>	<p>&gt; 112 Pa</p> <p>&lt; 249 Pa</p> <p>&gt; 15 %</p>	<p>This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed</p>		<p>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.</p> <p>12.5 ms / sample</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Large Leak Detected  (No ELCP - Conventional EVAP Diagnostic - with Purge Pump - with Fuel Tank Zone Module (FTZM))	P0455	<p>This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system.</p> <p>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.</p> <p>The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds.</p> <p>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.</p> <p>On fuel systems with fuel caps</p> <p>If the first failure of</p>	<p>Purge volume</p> <p>while Tank vacuum</p> <p>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.</p>	<p>&gt; refer to <b>P0455 large leak diagnostic displaced purge volume threshold</b> in Supporting Tables. Calibration threshold (liters) for large leak diagnostic as function of barometric pressure (kPa)</p> <p>≤ refer to <b>P0455 large leak diagnostic tank vacuum threshold</b> in Supporting Tables. Calibration threshold (Pa) for large leak diagnostic as function of barometric pressure (kPa)</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage Barometric Pressure Purge Flow</p> <p>No active DTCs:</p> <p>No Active DTC's TFTKO</p> <p>If ECT &gt; IAT, Startup temperature delta (ECT-IAT):</p>	<p>10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa ≥ 3.00 %</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA LIN Communication Fault Active</p> <p>P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2</p> <p>≤ 8 °C 4 °C ≤ Temperature ≤ 35 °C</p>	<p>Once per cold start</p> <p>Time is dependent on driving conditions</p> <p>Maximum time before test abort is 1,400 seconds</p> <p>Weak Vacuum Follow-up Test</p> <p>With large leak detected, the follow-up test is limited to 0 seconds. Once the MIL is on, the follow-up test runs indefinitely.</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>On fuel systems without fuel caps</p> <p>The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.</p>	<p>Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed.</p> <p>Passes if tank vacuum</p> <p>Note: Weak Vacuum Follow-up Test can only report a pass.</p>	$\geq 1,993 \text{ Pa}$	<p>Startup IAT Startup ECT</p> <p>Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.</p>	$\leq 35^{\circ}\text{C}$		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit Low  (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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between output and controller ground	Diagnostic is Enabled  Powertrain relay voltage	Voltage $\geq 11.0$ volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips  Note: In certain controlle rs P0443 may also set (Caniste r Purge Solenoid Open Circuit)

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit High  (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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between output and controller power	Diagnostic is Enabled  Powertrain relay voltage	Voltage $\geq 11.0$ volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance  (For use on vehicles with two fuel senders and mechanical transfer pump)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	1) ***** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ***** 1a) If Deadband diagnostic subtest enabled 1b) If fuel volume in primary tank is 1c) and if fuel volume in secondary tank is 1d) and if 1b and 1c indications do not change while fuel volume consumed by engine is  OR 2) ***** After Refuel Event ***** 2a) If primary tank volume change from Engine Off to next Engine On condition is 2b) then secondary tank volume change must be  OR 3) ***** Fuel consumed without a Primary Fuel Level Change ***** 3a) If indicated fuel	1a) == Disabled status  1b) ≥ 1,024.0 liters 1c) < 2.7 liters 1d) ≥ 18.0 liters  2a) ≥ 1,023.98 liters 2b) ≥ 3.00 liters	1a) Diagnostic Enabled  1b) Engine Operational State  2) Primary tank indicated volume @ shutdown plus 3.0 liters	1a) == True  1b) == Running  2) < 1,024.0 liters	250 ms / sample	Type B, 2 Trips

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			volume change is 3b) while fuel consumed by the engine is	< 3 liters  ≥ 24.4 liters				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	< 10 % or 32.03 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples  100 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float)	P0463	This DTC will detect a primary fuel tank level sensor out-of-range high.	Fuel level Sender % of 5V range	> 60 % or 3.14 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True  b) == True  c) == True  d) <> True	100 failures out of 125 samples  100 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Intermittent  (No ELCP - Conventional EVAP Diagnostic)	P0464	<p>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.</p> <p>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.</p> <p>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."</p> <p>The fuel level change rationality diagnostic is an "X out of Y" test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the rationality test has an</p>	<p>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.</p> <p>An intermittent fuel level signal problem is defined as:</p> <p>The fuel level changes by &gt; 15 % and does not remain for 30 seconds during a 600 second refueling rationality test.</p>	<p>&gt; 15 % &gt; 15 %</p>	<p>This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes</p>		<p>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.</p> <p>100 ms / sample</p>	Type A, 1 Trips

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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] <b>P0494_LIN_Threshold</b> <b>d</b>	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <> True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] == TRUE	16.00 failures / 20.00 samples;  1000 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Flow During Non- Purge  (No ELCP - Conventional EVAP Diagnostic - with purge pump - with Fuel Tank Zone Module (FTZM))	P0496	<p>This DTC will determine if the purge valve solenoid is leaking into the induction system or is leaking between the purge pump and purge valve solenoid.</p> <p>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.</p> <p>Additional Information</p> <p>The purge valve leak diagnostic exists to help service replace leaking purge valves that could otherwise be detected with the EONV small leak diagnostic (P0442).</p>	<p>Tank Vacuum</p> <p>for</p> <p>Test time</p>	<p>&gt; refer to <b>P0496 purge valve leak diagnostic vacuum threshold</b> in Supporting Tables. Calibration threshold (Pa) for purge valve leak diagnostic as func (baro) as a function of barometric pressure (kPa) 5 seconds</p> <p>≤ refer to <b>P0496 purge valve leak test time as a function of fuel level and barometric pressure</b> in Supporting Tables.</p> <p>Test time only increments when engine vacuum ≥ 10.0 kPa.</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage Barometric pressure Startup IAT</p> <p>Startup ECT Engine Off Time</p> <p>Initial purge pump pressure</p> <p>P146C EVAP Purge Pump System Misassembled diagnostic is not running</p> <p>Purge pump over tempertaure status is False</p> <p>No active DTCs:</p> <p>No pending DTCs:</p>	<p>10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 35 °C</p> <p>≤ 35 °C ≥ 28,800.0 seconds</p> <p>≥ 3.1 kPa</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA LIN Communication Fault Active</p> <p>LIN Communication Fault Pending</p>	<p>Once per cold start</p> <p>Cold start: max time is 1,400 seconds</p>	Type B, 2 Trips



210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DTC's TFTKO	P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit Low  (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between output and controller ground	Diagnostic is Enabled  No active DTC's:	P1005 P130F U18A2	50 failures out of 63 samples  100 ms / sample	Type B, 2 Trips  Note: In certain controlle rs P0449 may also set (Vent Solenoid Open Circuit)

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit High  (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone 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.  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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between output and controller power	Diagnostic is Enabled  No active DTC's:	P1005 P130F U18A2	50 failures out of 63 samples  100 ms / sample	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankcase Ventilation System Disconnecte d	P04DB	<p>The Crankcase Ventilation System Disconnected Diagnostic monitors the performance of the Positive Crankcase Ventilation (PCV) System.</p> <p>After the enable conditions are met, this monitor will will evaluate the signal of the Crankcase Ventilation Pressure sensor. This sensor is mounted in the PCV hose between the crankcase and the engine induction system.</p> <p>During normal operation, the sensor will see a pressure drop that varies in conjunction with the engine air flow. Additionally, the sensor will see pressure pulses as the cylinders go up and down in the crankcase. This monitor evaluates both the signal offset based on the pressure drop, and the signal noise based on the pressure pulses.</p> <p>The product of the</p>	<p>ScaledSignalLo * ScaledNoiseLo or ScaledSignalHi * ScaledNoiseHi</p> <p>Where ScaledSignalLo =</p> <p>Where ScaledNoiseLo =</p> <p>Where ScaledSignalHi =</p>	<p>&lt; 1.20 kPa * kPa</p> <p>&gt; 9,999.00 kPa * kPa</p> <p>Average Crankcase Ventilation Pressure Signal value calculated over the sample period and normalized as a function of engine air flow based on table <b>P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case</b></p> <p>0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalLo.</p> <p>Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table <b>P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case</b></p> <p>Average Crankcase Ventilation Pressure</p>	<p>Diagnostic is Enabled</p> <p>Outside Air Temperature Engine Coolant Temperature Barometric Pressure</p> <p><u>Stability conditions:</u> Engine Air Flow Engine Air Flow Engine Vacuum Engine Vacuum Engine Speed Engine Speed</p> <p>Maximum Engine Air Flow - Minimum Engine Air Flow over the sample period</p> <p>Time that stability conditions must be met prior to sampling data</p> <p>Stability conditions must continue to be met as the data sample is collected over a period</p> <p><u>DTCs Active:</u></p> <p><u>DTCs Pending:</u></p>	<p>&gt;= -9.0 Degrees C</p> <p>&gt;= 65.0 Degrees C</p> <p>&gt;= 70.0 kPa</p> <p>&gt;= 56.0 Grams/Second</p> <p>&lt;= 77.0 Grams/Second</p> <p>&gt;= -120.0 kPa</p> <p>&lt;= -50.0 kPa</p> <p>&gt;= 1,900 RPM</p> <p>&lt;= 2,700 RPM</p> <p>&lt;= 20.0 Grams/Second</p> <p>= 0.5 Seconds</p> <p>= 0.5 Seconds</p> <p>MAF_SensorFA MAP_SensorFA OAT_PtEstFiltFA AmbPresDfIttdStatus ECT_Sensor_FA PCV_Sensor_FA</p> <p>PCV_Sensor_Circuit_FA</p>	The DTC will fail immediately if the malfunction criteria are met	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>signal offset and signal noise is compared to a calibration threshold during certain engine operating conditions. If this product is between two failure thresholds, the system is operating as expected, and the monitor passes. If the product is outside of the two failure thresholds, the system is disconnected, and the monitor fails.</p>	<p>Where ScaledNoiseHi =</p> <p>The Crankcase Ventilation Pressure Sensor is sampled every 3.125 msec to calculate ScaledSignalLo/Hi and ScaledNoiseLo/Hi.</p> <p>ScaledSignalLo/Hi and ScaledNoiseLo/Hi values are accumulated over a period of 0.5 Seconds.</p>	<p>Signal value calculated over the sample period and normalized as a function of engine air flow based on table <b>P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case</b></p> <p>0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalHi.</p> <p>Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table <b>P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case</b></p>				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankcase Ventilation Hose Connection Sensor Circuit Low	P04E2	<p>Detects a continuous open or short to ground in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too low.</p> <p>The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.</p>	Crankcase Ventilation Pressure Voltage	<= 4.3 % of 5 Volt Range (This is equal to -5.71 kPa)	Diagnostic is Enabled		<p>1,280 failures out of 1,600 samples</p> <p>1 sample every 3.125 msec</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankcase Ventilation Hose Connection Sensor Circuit High	P04E3	<p>Detects a continuous short to power in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too high.</p> <p>The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.</p>	Crankcase Ventilation Pressure Voltage	>= 95.5 % of 5 Volt Range (This is equal to 5.69 kPa)	Diagnostic is Enabled		<p>1,280 failures out of 1,600 samples</p> <p>1 sample every 3.125 msec</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankcase Ventilation Hose Connection Sensor Range/ Performance	P04FB	<p>Detects a performance failure in the Crankcase Ventilation Pressure sensor, such as when the sensor value is stuck in range.</p> <p>If the engine has been off for a sufficient amount of time, the pressure in the crankcase ventilation system will equalize to atmospheric pressure. The Crankcase Ventilation Pressure sensor value is checked to see if it is within the normal expected range around the expected value of 0 kPa. If it is not, the Crankcase Ventilation Pressure performance diagnostic will fail.</p> <p>The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.</p>	<p>Crankcase Ventilation Pressure</p> <p>OR</p> <p>Crankcase Ventilation Pressure</p>	<p><math>\geq 0.63</math> kPa</p> <p><math>\leq -0.63</math> kPa</p>	<p>Diagnostic is Enabled</p> <p>Engine is not rotating</p> <p>Time since engine has stopped rotating</p> <p>Engine Coolant Temperature</p> <p><u>DTCs Active:</u></p>	<p><math>\geq 10.0</math> seconds</p> <p><math>\geq 70.0</math> deg C</p> <p>PCV_Sensor_Circuit_FA ECT_Sensor_FA EngineModeNotRunTimer Error</p>	<p>128 failures out of 160 samples</p> <p>1 sample every 3.125 msec</p>	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Filter coefficient	> 95.00 rpm  0.00375	Baro  Coolant Temp  Engine run time Ignition voltage Time since gear change  Time since a TCC mode change  IAT Vehicle speed Commanded RPM delta Idle time  For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa  > 60 °C  ≥ 60 sec 32 ≥ volts ≥ 11 ≥ 3 sec ≥ 3 sec  > -20 °C ≤ 1.24 mph, 2kph ≤ 25 rpm > 10 sec  > 90.00 pct < 16.00 pct  PTO not active  Transfer Case not in 4WD LowState	Diagnostic runs in every 12.5 ms loop  Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	Off-vehicle device control (service bay control) must not be active.  following conditions not TRUE: (VeTESR_e_EngSpdReqI ntvType = CeTESR_e_EngSpdMinLi mit AND VeTESR_e_EngSpdReqR espType = CeTESR_e_NoSuggestio n)  Clutch is not depressed  TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_F A IAT_SensorCircuitFA EvapFlowDuringNonPurg e_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_F A IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnos tic Clutch Sensor FA AmbPresDfItStatus		

210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Filter coefficient	< -190.00 rpm  0.00375	Baro  Coolant Temp  Engine run time Ignition voltage Time since gear change Time since a TCC mode change  IAT Vehicle speed Commanded RPM delta  For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa  > 60 °C  ≥ 60 sec 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec  > -20 °C ≤ 1.24 mph, 2kph ≤ 25 rpm  > 90.00 pct < 16.00 pct  PTO not active  Transfer Case not in 4WD LowState  Off-vehicle device control (service bay control) must not be active.	Diagnostic runs in every 12.5 ms loop  Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

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

21OBDG03D ECM Summary Tables

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

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Deceleration index vs. Engine Speed Vs Engine load</p> <p>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.</p> <p>Incomplete combustion identified by P0300 threshold tables:</p>	<p>(&gt;Idle SCD AND &gt;Idle SCD ddt Tables) OR (&gt;Idle Cyl Mode AND &gt; Idle Cyl Mode ddt Tables)</p>	<p>Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements)</p> <p>OBD Manufacturer Enable Counter</p> <p>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:</p> <p>Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure</p> <p>In addition, Dual Pulse Strategy Is Enabled and Active Per the following:</p> <p>Engine Speed</p> <p>Accel Position</p> <p>Engine Run Time</p> <p>For the engine speeds and loads in which Dual Pulse is active:</p>	<p>= 0</p> <p>&lt; 500.00 degC &gt; -12.00 degC &lt;= 72.00 degC &gt;= 72.00 KPa</p> <p>&gt;= 450.00 RPM &lt;= 2,800.00 RPM</p> <p>&lt;= 35.00 Pct</p> <p>&lt; 100 seconds</p>	<p>Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.</p> <p>Frequency: 100ms</p> <p>Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Dual Pulse Error induced misfires percentage</p> <p>Dual Pulse Error induced misfires percentage</p> <p>Engine Cycles</p> <p>The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:</p> <p>Catalyst Temperature AND Engine Run Time</p> <p>OR</p> <p>Engine Run Time</p> <p>OR</p> <p>Barometric Pressure</p>	<p>&gt;= catalyst damaging misfire</p> <p>&lt; 90% of the maximum achievable catalyst damaging misfire.</p> <p>&gt;= 80.00 &lt; 501</p> <p>&gt;= 700.00 degC &gt;= 0.00 seconds</p> <p>&gt;</p> <p><b>P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit</b></p> <p>This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.</p> <p>&lt; 72.00 KPa</p>		



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Dual Pulse Strategy will exit per the following:</p> <p>Engine Speed OR Accel Position Engine Run Time</p> <p>Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:</p> <p>"Additional Dual Pulse Enabling Criteria":</p> <p>Green Engine Enrichment</p> <p>Misfire Converter Protection strategy</p> <p>Engine Metal Overtemp strategy</p> <p>Fuel control state</p> <p>Output State Control</p> <p>DOD Or DFCO</p> <p>Power Enrichment</p> <p>Dynamic Power Enrichment</p> <p>Piston Protection</p> <p>Hot Coolant Enrichment</p>	<p>&gt; 3,000.00 RPM</p> <p>&gt; 40.00 Pct</p> <p>&gt;= 100 seconds</p> <p>Not Enabled</p> <p>Not being requested</p> <p>Not being requested</p> <p>Open Loop</p> <p>Not being requested for fuel</p> <p>Not Active</p> <p>Not Active</p> <p>Not Active</p> <p>Not Active</p> <p>Not Active</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Injector Flow Test  General Enable  DTC's Not Set:	Not Active   AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr_FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTKO FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTKO TransmissionEngagedState_FA EngineTorqueEstInaccuracy FuelPumpRlyCktFA		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Continuously Variable Displacement Oil Pump	P0521	<p>Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off. The engine oil pressure rationality diagnostic has two parts: engine running test and engine off test.</p> <p>The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.</p>	<p><b>Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State</b></p> <p><u>To Fail when previously passing with the engine running:</u></p> <p>Filtered Engine Oil Pressure below threshold</p> <p>OR</p> <p>Filtered Engine Oil Pressure above threshold</p> <p><u>To pass when previously failing:</u></p> <p>Filtered Engine Oil Pressure above low threshold plus an offset</p> <p>OR</p> <p>Filtered Engine Oil Pressure below high threshold minus an offset</p>	<p>Filtered Oil Pressure &lt; ( <b>P0521_CVDOP_MinOilPresFail</b> kPa)</p> <p>OR</p> <p>Filtered Oil Pressure &gt; ( <b>P0521_CVDOP_MaxOilPressure</b> kPa)</p> <p>Filtered Oil Pressure &gt; ( <b>P0521_CVDOP_MinOilPresFail</b> + 10.0 kPa)</p> <p>OR</p> <p>Filtered Oil Pressure &lt; ( <b>P0521_CVDOP_MaxOilPressure</b> - 10.0 kPa)</p>	<p>Variable Displacement Oil Pump is Present = TRUE</p> <p>Engine Running Diagnostic Status</p> <p>Engine Off Rationality Test Diagnostic Reporting Status</p> <p>Oil Pressure Sensor In Use</p> <p>Engine Running</p> <p>Ambient Air Pressure</p> <p>Oil Aeration (= TRUE if engine speed &gt; 5,000 RPM for longer than <b>TimeForOilAeration</b> seconds)</p> <p>Filtered Engine Speed within range</p> <p>Sensed Oil Temperature within range</p> <p>Engine Speed stable</p> <p>No active DTC's</p>	<p>Enabled</p> <p>Enabled</p> <p>Test not report a fail state</p> <p>Yes</p> <p>≥ 15.0 seconds</p> <p>≥ 70.0 kPa</p> <p>FALSE</p> <p>1,200 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM</p> <p>40.0 deg C ≤ Sensed Oil Temperature ≤ 120.0 deg C</p> <p>(RPM - Previous RPM) &lt; 35</p> <p>Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA CrankSensor_FA</p>	<p>≥ 40 errors out of 50 samples.</p> <p>Performed every 100 msec</p> <p>≥ 10 passes out of 50 samples.</p> <p>Performed every 100 msec</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<b>Two Stage Oil Pump EOP Sensor Test with Engine Off</b>  If enabled:  <u>To Fail when previously passing with the engine off.</u>  Difference between oil pressure and Barometric pressure is  Greater than a threshold  OR  Less than a threshold	          (Oil Pressure - Barometric Pressure)  ≥ -50.0 kPa  OR  ≤ 30.0 kPa	Two Stage Oil Pump is Present = TRUE  Engine Off Rationality Test Diagnostic Status  Engine Running Rationality Test Diagnostic Status  Modelled Oil Temperature No Engine Movement No active DTC's	Enabled  Enabled  Test not report a fail state  ≥ 60.0 deg C > 10.0 seconds EngineModeNotRunTimer _FA EngOilTempFA EngOilPressureSensorCkt FA CrankSensor_FA	≥ 20 errors out of 40 samples.  Run once per trip	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>&lt; 5.00 percent</p> <p>Deadband: &lt; 5 percent or &gt; 95 percent</p>	<p>Engine Speed Enable Engine Speed Disable</p> <p>Oil Pressure Sensor In Use</p> <p>Diagnostic Status</p>	<p>&gt; 540 rpm &lt; 490 rpm</p> <p>Yes</p> <p>Enabled</p>	<p>1,280 failures out of 1,600 samples</p> <p>Performed every 3.125 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Deadband: < 5 percent or > 95 percent	Oil Pressure Sensor In Use  Diagnostic Status	Yes  Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil- Functon Switch Circuit	P0564	<p>Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range.</p> <p>"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."</p>	<p>Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.</p>	<p>The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges:</p> <p>0.28 -0.31, 0.415-0.445, 0.585 - 0.615 0.78 - 0.81, 1.005 - 1.035</p>	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control On Switch Circuit	P0565	<p>Detects a failure of the cruise on/off switch in a continuously applied state</p> <p>"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.</p>	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	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 20.00 seconds	<p>Type C, No SVS</p> <p>, "Emissions Neutral Diagnostics – special type C"</p>



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	<p>Detects a failure of the cruise resume switch in a continuously applied state</p> <p>"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."</p>	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	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 89.000 seconds	<p>Type C, No SVS</p> <p>, "Emissions Neutral Diagnostics – special type C"</p>

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continuously applied state "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.  CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel Switch Circuit	P056C	<p>Detects a failure of the cruise cancel switch in a continuously applied state</p> <p>"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."</p>	Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 20.00 seconds	<p>Type C, No SVS , "Emissions Neutral Diagnostics – special type C"</p>

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid.  "Emissions Neutral Default Action : When the ECM determines that a serial communication fault from the BCM has occurred with frame \$1E1, 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."	If x of y rolling count / protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message          Message rollding count<>previous message rolling count value plus one	Diagnostic is enabled.  Cruise Control Switch Serial Data Error Diagnostic Enable  Serial communication to BCM  Power Mode Engine Running	0.00  No loss of communication  = RUN = TRUE	9 failures out of / 17 samples  Performed on every received message    9 rolling count failures out of / 17 samples  Performed on every received messagw	Type C, No SVS  'Emissio ns Neutral Diagnost ics – special type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00  ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable threshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table <b>P057B</b> <b>KtBRKI_K_FastTestPointWeight</b> 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  OR  calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 4.53  OR (for slow test)  shift lever has been in park once this key cycle  vehicle speed >= 5.00  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 <b>P057B</b> <b>KtBRKI_K_CmpltTestPointWeight</b> P057B as a function of calculated brake pedal position delta EWMA value is less than 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle  vehicle speed >= 5.00  accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	5.00	Diagnostic is enabled.  Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00 /  32.00 counts	MIL: Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic output 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	15.00	Diagnostic is enabled.  Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00 /  20.00 counts	MIL: Type A, 1 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit  "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit 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.	Cruise Control analog circuit voltage must be in an "Open 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 ranges:  0 - 0.185	Diagnostic is enabled.  CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit  "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit 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:  1.005 - 1.035	Diagnostic is enabled.  CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- Function Input B Circuit	P0589	<p>Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range</p> <p>"Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit 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.</p>	Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time.	<p>The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges:</p> <p>0.28 -0.31,</p> <p>0.415-0.445,</p> <p>0.585 - 0.615,</p> <p>0.78 - 0.81,</p> <p>1.005 - 1.035</p>	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 0.500 seconds	<p>Type C, No SVS</p> <p>, "Emissions Neutral Diagnostics – special type C"</p>

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Performance	P058A	This DTC monitors for a battery module internal fault	Battery Module signals an internal fault via LIN bus  VeVITR_e_IBS_InternalF ault	= CeVITR_e_DiagFailed	The diagnostic is enabled  System Diagnostics Disabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  = False  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Monitoring Performance	P058B	This DTC monitors for a battery module current fault	Battery Module signals an internal fault via LIN bus  VeVITR_e_BatCurrRatDia g	= CeVITR_e_DiagFailed	The diagnostic is enabled  System Diagnostics Disabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  = False  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Monitoring Performance	P058C	This DTC monitors for a battery module temperature fault	Difference between Battery Module raw temperature values	> 10.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>System Diagnostics Disabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Temperature Data Available over LIN bus</p> <p>Internal Temperature Circuit Low Fault Active (P16DE)</p> <p>Internal Temperature</p>	<p>Enabled</p> <p>Enabled</p> <p>= False</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24</p> <p>= Zero</p> <p>= True</p> <p>= False</p>	<p>8 failed samples within 10 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Circuit High Fault Active (P16DF)  Battery Module Temperature Too High Fault Active (P058E)  Battery Module Temperature Too Low Fault Active (P058F)	= False  = False  = False		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Voltage Monitoring Performance	P058D	This DTC monitors for a battery module voltage fault	Difference between 12V System Reference Voltage and IBS 12V Battery Voltage values	> 5.00 Volts	The diagnostic is enabled  System Diagnostics Disabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit  IBS Voltage and Current Data Available over LIN bus  Battery Monitor Module Circuit Low Voltage Fault Active (P16D4)  Battery Monitor Module Circuit High Voltage Fault Active (P16D5)	Enabled  = False  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True  = True  = False  = False	32 failed samples within 40 total samples  Diagnostic runs in the 250 ms loop	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too High	P058E	This DTC monitors for a battery module temperature too high fault	Battery Module raw temperature 2 value	> 120.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>System Diagnostics Disabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>= False</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24</p> <p>= zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too Low	P058F	This DTC monitors for a battery module temperature too low fault.	Battery Module raw temperature 2 value	< -43.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>System Diagnostics Disabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>= False</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24</p> <p>= Zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B.  "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected 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 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 ground" when the ratio is measured in the following ranges:  0 - 0.185	Diagnostic is enabled.  CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- Function Input B Circuit High	P0593	detects short to power failure for cruise multi-function switch circuit B  "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit 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:  1.005 - 1.035	Diagnostic is enabled.  CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condition] 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 position [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	<> Smart Shutter Actuator 1 Commanded Position percent	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE,  b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples  1 sample / 100 milliseconds	Type B, 2 Trips
			AND  Shutter 1 Diagnostic Delay Threshold count	AND  Counter > 129.00 counts				
			Shutter 1 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE,  b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles  [1 cycle typically requires 10-25 seconds]	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Cold Start Performance – Bank 1	P05CC	<p>Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when VVT is activated.</p> <p>This is the same type diagnostic as P0011 except this detects excessive deviations of position while the cold start phaser positions are being commanded.</p>	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	<p>Diagnosis is Enabled</p> <p><b>Intake Cam Phsr Enable</b></p> <p>System Voltage</p> <p>Engine Running</p> <p>Power Take Off (PTO) active</p> <p><b>Catalyst Warmup Enabled</b></p> <p>Desired cam position</p> <p>Desired AND Measured cam position</p> <p>Desired cam position variation</p> <p>No Active DTCs</p>	<p>' = TRUE</p> <p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>= FALSE</p> <p>= TRUE</p> <p>&gt; 0 deg</p> <p>&gt; 6.00 deg AND &lt; 26.00 deg</p> <p>&lt; 3.00 deg for ( <b>P0011_P05CC_StablePo sitionTimeIc1</b> ) seconds</p> <p>P0010 P2088 P2089</p>	<p>65 failures out of 75 samples</p> <p>100 ms /sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft System Cold Start Performance – Bank 1	P05CE	<p>Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when VVT is activated.</p> <p>This is the same type diagnostic as P0014 except this detects excessive deviations of position while the cold start phaser positions are being commanded.</p>	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	<p>Diagnostic is Enabled</p> <p><b>Exhaust Cam Phsr Enable</b></p> <p>System Voltage</p> <p>Engine Running</p> <p>Power Take Off (PTO) active</p> <p><b>Catalyst Warmup Enabled</b></p> <p>Desired cam position</p> <p>Desired AND Measured cam position</p> <p>Desired cam position variation</p> <p>No Active DTCs</p>	<p>= TRUE</p> <p>&gt; 11.00 volts</p> <p>= TRUE</p> <p>= FALSE</p> <p>= TRUE</p> <p>&gt; 0 deg</p> <p>&gt; 6.00 deg AND &lt; 32.00 deg</p> <p>&lt; 3.00 deg for ( <b>P0014_P05CE_StablePo sitionTimeEc1</b> ) sec</p> <p>P0013 P2090 P2091</p>	<p>65 failures out of 75 samples</p> <p>100 ms /sample</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total 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				



## 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	0.45384 s			When dual store updates occur.	

21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 processors.	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			Test is 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			Test is 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		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is 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 occurred since last controller initialization.	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	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 occurred 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	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is 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.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: <b>P0606_PSW Sequence Fail f (Loop Time)</b> /  Sample Table, f (Loop Time)See supporting tables: <b>P0606_PSW Sequence Sample f(Loop Time)</b>  counts  50 ms/count in the ECM main processor	

## 21OBDG03D ECM Summary Tables

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

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.			Test is 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 occurred 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 occurred 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 RAM variable, depends on length of time to write flash to RAM	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ANDR ADC 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	

210BDG03D ECM Summary Tables

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

# 210BDG03D ECM Summary Tables

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

# 210BDG03D ECM Summary Tables

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

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit High Voltage (Conventional)	P0617	Controller specific output driver circuit diagnoses the Starter 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	<p>&lt;= 0.5 Ohms impedance between signal and controller power</p>	<p>Starter control diag enable = TRUE</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>&gt;= 0.00 RPM</p> <p>&gt;= 6.41 volts</p>	<p>40 failures out of 50 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injector 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  OR  Internal ECU Boost Voltage  OR  Driver Status  OR  Driver Status	>= 90 Volts       <= 40 Volts       = Not Ready       = Uninitialized	Battery Voltage	>= 8 or >= 11       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       Low Voltage - 160 failures out of 200 samples       Driver Status Not Ready- 160 failures out of 200 samples       Driver Status Uninitialized - Uninitialized state for >= 100 counts       All at 12.5ms per sample	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

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



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vref1 and failing the diagnostic when the percent Vref1 is too low or too high or if the delta between the filtered percent Vref1 and non-filtered percent Vref1 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref1 < or ECM percent Vref1 > or the difference between ECM filtered percent Vref1 and percent Vref1 >	4.875 % Vref1 5.125 % Vref1  0.0495 % Vref1	Diagnostic enabled  AND [  (Run/Crank voltage for Time period AND Starter engaged)  OR  (Run/Crank voltage AND Starter engaged) ]	= 1    > 6.41 Volts = 25.00 Seconds = FALSE   > 8.41 Volts = TRUE	19 / 39 counts; or  187.5000 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module O2 Sensor Processor Performance Bank 1) (For use with WRAF	P064D	<p>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.</p> <p>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.</p>	B1S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	<p>Diagnostic is Enabled</p> <p>Engine Run or Auto stop</p> <p>Heater Warm-up delay</p> <p>WRAF circuit diagnostic delay since power up</p>	<p>= True</p> <p>= Complete</p> <p>≥ 20.0 sec</p>	<p>128 controller status fail counts out of 160 samples</p> <p>OR</p> <p>128 measure valid fail counts out of 160 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Detects an inoperative malfunction indicator lamp control low side driver circuit. This diagnostic reports the DTC when an open circuit is detected.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K $\Omega$ impedance between signal and controller ground	Run/Crank Voltage  Remote Vehicle Start is not active	Voltage ≥ 11.00 volts	1 failures out of 1 samples  50 ms / sample	Type B, No MIL  NO MIL  Note: In certain controlle rs P263A may also set (MIL Control Short to Ground)

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 >	4.875 % Vref2 5.125 % Vref2  0.0495 % Vref2	Diagnostic enabled  AND [ (Run/Crank voltage for Time period AND Starter engaged)  OR (Run/Crank voltage AND Starter engaged) ]	= 1   > 6.41 Volts = 25.00 Seconds = FALSE   > 8.41 Volts = TRUE	19 / 39 counts; or  187.5000 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open	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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	Open Circuit: ≥ 200 K $\Omega$ ohms impedance between output and controller ground	Powertrain relay Open circuit diagnostic diagnostic enable = TRUE  Run/Crank Voltage	1.00  Voltage ≥ 11.00 volts	8 failures out of 10 samples  250 ms / sample	Type B, 2 Trips  Note: In certain controlle rs P0686 may also set (Powertr ain Relay Control Short to Ground).

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to ground: $\leq 0.5 \Omega$ impedance between output and controller ground	<p>Powertrain relay Low Side driver short to ground diagnostic diagnostic enable = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage <math>\geq 11.00</math> volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) High	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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	Short to power: $\leq 0.5 \Omega$ impedance between output and controller power	Powertrain relay Low Side driver short to power diagnostic enable = TRUE  Run/Crank Voltage	1.00  Voltage $\geq 11.00$ volts	8 failures out of 10 samples  250 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 $\leq 5.00$	Powertrain relay short low diagnostic enable  Run Crank voltage  Powertrain relay state	= 1.00  > 9.00  = ON	5 failures out of 6 samples  1000 ms / sample	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Feedback Circuit High	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  Powertrain relay commanded "OFF"  No active DTCs:	1.00  >= 2.00 seconds  PowertrainRelayStateOn_FA	50 failures out of 63 samples  100ms / Sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 >	4.875 % Vref3 5.125 % Vref3  0.0495 % Vref3	Diagnostic enabled  AND [ (Run/Crank voltage for Time period AND Starter engaged)  OR (Run/Crank voltage AND Starter engaged) ]	= 1   > 6.41 Volts = 25.00 Seconds = FALSE   > 8.41 Volts = TRUE	19 / 39 counts; or  187.5000 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 >	4.875 % Vref4 5.125 % Vref4  0.0495 % Vref4	Diagnostic enabled  AND [ (Run/Crank voltage for Time period AND Starter engaged)  OR (Run/Crank voltage AND Starter engaged) ]	= 1   > 6.41 Volts = 25.00 Seconds = FALSE   > 8.41 Volts = TRUE	19 / 39 counts; or  187.5000 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<b>&gt;</b> <b>P06B6_P06B7_OpenT</b> <b>estCktThrshMin</b>  <b>AND</b>  <b>&lt;</b> <b>P06B6_P06B7_OpenT</b> <b>estCktThrshMax</b>  <b>See Supporting</b> <b>Tables</b>	Diagnostic Enabled?  Engine Run Time  Engine Speed  Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)  Engine Air Flow	Yes  ≥ 0.0 seconds  > 650 RPM and < 3,400 RPM  ≥ 300 Revs    ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient  Weight Coefficient = 0.0103  Updated each engine event	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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?  FFT Diagnostic Output	1.00 , Use Case 2  <b>Case 1:</b>  > <b>P06B6_P06B7_OpenTestCktThrshMin</b>  <b>AND</b>  < <b>P06B6_P06B7_OpenTestCktThrshMax</b>  <b>See Supporting Tables</b>  <b>Case 2:</b>  > <b>P06B7_OpenTestCktMin2</b>  <b>AND</b>  < <b>P06B7_OpenTestCktMax2</b>  <b>See Supporting Tables</b>	Diagnostic Enabled?  Engine Run Time  Engine Speed  Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)  Engine Air Flow	Yes  ≥ 0.0 seconds  > 650 RPM and < 3,400 RPM  ≥ 300 Revs  ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient  <b>Case 1 Weight Coefficient =</b>  0.0103  Updated each engine event  <b>Case 2 Weight Coefficient =</b> 0.0103  Updated each engine event	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure Control Circuit/Open	P06DA	Controller specific output driver circuit diagnoses the oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	Open Circuit ≥ 200 k Ω impedance between output and controller ground	<p>Powertrain Relay Voltage</p> <p>Run/Crank Active</p> <p>Cranking State</p>	<p>≥ 11.00</p> <p>= True</p> <p>= False</p>	<p>≥ 40 errors out of 50 samples.</p> <p>Performed every 100 msec</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controllers P06DB may also set (Engine Oil Pressure Control Circuit Short To Ground)</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure Control Circuit Low	P06DB	Controller specific output driver circuit diagnoses the oil pump 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to Ground Circuit $\leq 0.5 \Omega$ impedance between output and controller ground	Powertrain Relay Voltage  Run/Crank Active  Cranking State	$\geq 11.00$  = True  = False	$\geq 40$ errors out of 50 samples.  Performed every 100 msec	Type A, 1 Trips  Note: In certain controlle rs P06DA may also set (Engine Oil Pressure Control Circuit Open)

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure Control Circuit High	P06DC	Controller specific output driver circuit diagnoses the oil pump 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	Short to Power $\leq 0.5 \Omega$ impedance between output and controller power	Powertrain Relay Voltage  Run/Crank Active  Cranking State	$\geq 11.00$  = True  = False	$\geq 40$ errors out of 50 samples.  Performed every 100 msec	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Oil Pump Control Circuit Performance - Continuously Variable Displacement Oil Pump	P06DD	Diagnoses the performance of the oil pump controls. The test determines if the oil pump is capable of meeting the pressure demand.	<p>Absolute Oil Pressure Error =</p> <p>ABS [ Desired Oil Pressure - Measured Oil Pressure]</p> <p>A first-order lag filter is applied to the error value, every 100ms:</p> <p>Filtered Pressure Error = Previous Error + 0.00400 *(New Error - Previous Error)</p> <p><u>Fail from passing state:</u></p> <p>Filtered Oil Pressure Error is greater than a threshold AND the cyclor algorithm is unable to clear the fault.</p> <p><u>Pass from failing state:</u></p>	<p>Filtered Pressure Error <math>\geq</math> 35.00 kPa</p> <p>AND</p> <p>Cyclor Algorithm has cycled the pump solenoid for 4.50 seconds</p> <p>AND</p> <p>Filtered Pressure Error <math>\geq</math> <b>P06DD_CVDOP_MaxPressErr</b> after the cyclor is complete</p>	<p><u>Common Criteria:</u></p> <p>Closed Loop Pump Control Active</p> <p>Engine Running</p> <p>Powertrain Relay Voltage <math>\geq</math> 11.00</p> <p>Desired Oil Pressure in Range</p> <p>Oil Temperature in Range</p> <p>Engine Speed in Range</p>	<p><b>P06DD_CVDOP_MinDesPres</b> <math>\leq</math> Desired Oil Pressure <math>\leq</math> <b>P06DD_CVDOP_MaxDesPress</b></p> <p>40.00 °C <math>\leq</math> Oil Temp <math>\leq</math> 120.00 °C</p> <p>1,200 RPM <math>\leq</math> Engine Speed <math>\leq</math> 4,500</p>	Performed every 100ms.	Type A, 1 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Oil Pressure Error is less than a threshold	Filtered Pressure Error < P06DD_CVDOP_Max PressErr				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request message to determine when the TCM has detected a MIL illuminating fault.	Transmission Control Module Emissions-Related DTC set and module is requesting MIL	Transmission Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up $\geq$ 3 seconds	Continuous	Type A, No MIL

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range  Commanded Transmission Range  AND CodeClearFunction AND ManufacturingModeActive AND:  External: Run/Crank OR Accessory/Wakeup  Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup  cal must be =6 to enable a type B DTC:	= Good value   = Neutral  =False =False  =True = True  =True =Park =False  6.00	10,000.00 msec from Park  10,000.00 msec from Reverse  10,000.00 msec from Drive	DTC Type B, Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Reverse	P073E	Detects the failure to achieve the expected command to Reverse range.	Actual Arbitrated Transmission Range	≠Reverse	Actual Transmission Range  Commanded Transmission Range  AND CodeClearFunction AND ManufacturingModeActive AND:  External: Run/Crank OR Accessory/Wakeup  Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup  cal must be =6 to enable a type B DTC:	= Good value      = Reverse  =False =False  =True =True  =True =Park =False  6.00	10,000.00 msec from Park  3,600,000.00 msec from Neutral*  3,600,000.00 msec from Drive*  *Internal does not diagnose from N&D	DTC Type B, Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Park Position Sensor/ Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading LowCorrelation diagnostic compares the two switches behind the Park pushbutton	Park Position Measured Voltage	< Low 446 counts  446 counts = 43.6% of 5 Volts  1023 counts = 5 Volts	The enabling calibration must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Park Position Sensor/ Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enable calibration for this DTC must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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)  53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set  The enabling calibration for this DTC must be set to 6 to enable a type B DTC:	P07B3 OR P07B4   6.00	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, two trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Park Position Sensor/ Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts.  1023 Counts = 5 V	Diagnostic Enable Calibration  The enabling calibration must be set to 6 to enable a type B DTC:	=TRUE   6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Park Position Sensor/ Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration  The enabling calibration for this DTC must be set to 6 to enable a type B DTC:	=TRUE  6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)  53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration  DTC not set  The enabling calibration for this DTC must be set to 6 to enable a type B:	=TRUE  P07BA or P07B9  6.00	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B two trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnostic compares the two switches behind the Park pushbutton	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states.  Park 1 and Park 2 are both:	=Valid, but not equal continuously  = valid states (RELEASED or PRESSED), but disagree.	Not Fault Active  Diagnostic System Disable Calibration:  Park Comparison Diagnostics Enable Calibration:  Vehicle speed:  Cal must be =6 to enable type B DTC:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB  =FALSE  = TRUE  <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .  6.00	4,800 failures out of 6,000 samples  12.5 ms rate	DTC Type B, two trips.

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Park	P07E4	Detects the inability to achieve or remain in Park.	Actual Arbitrated Transmission Range	#Park	<p>Actual Transmission Range</p> <p>Commanded Transmission Range</p> <p>AND CodeClearFunction AND ManufacturingModeActive AND:</p> <p>External: Run/Crank OR Accessory/Wakeup</p> <p>Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup</p> <p>cal must be =6 to enable a type B DTC:</p>	<p>= Good value</p> <p>= Park</p> <p>=False</p> <p>=False</p> <p>=True</p> <p>= True</p> <p>=True =Park</p> <p>=False</p> <p>6.00</p>	<p>10,000.00 msec from Reverse</p> <p>10,000.00 msec from Neutral</p> <p>10,000.00 msec from Drive</p>	DTC Type B, Two Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Drive	P07E5	Detects the failure to achieve the expected command to Drive range.	Actual Arbitrated Transmission Range	≠Drive	Actual Transmission Range  Commanded Transmission Range  AND CodeClearFunction AND ManufacturingModeActive AND:  External: Run/Crank OR Accessory/Wakeup  Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup  cal must be =6 to enable a type B DTC:	= Good value   = Drive  =False =False  =True = True  =True =Park =False  6.00	10,000.00 msec from Park  10,000.00 msec from Reverse  10,000.00 msec from Neutral	DTC Type B, Two Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  Gear Lever Position Sensor 1 Frequency error detection flag on X  OR  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  OR  = True  > 12.00 %	Not Fault Active  Controller has been awake for at least  Cal must be equal to 6 to enable a type B DTC:	P082B, P082C  0.05 seconds  6.00	3.00 failures out of 4.00 samples  25ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  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  = True	Not Fault Active  Controller has been awake for at least  Cal must be equal to 6 to enable a type B DTC:	P082E, P082F  0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBCM is valid	<p>Serial Communication 2's complement message - (\$1C7/\$1C9 for engine torque, \$1CA/\$1C6 for axle torque)</p> <p>OR</p> <p>Serial Communication message (\$1C7/\$1C9 for engine torque, \$1CA/ \$1C6 for axle torque) rolling count index value</p> <p>OR</p> <p>Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period</p> <p>Torque request greater than torque request diagnostic maximum threshold</p>	<p>Message &lt;&gt; 2's complement of message</p> <p>Message rolling count value &lt;&gt; previous message rolling count value plus one</p> <p>Requested torque intervention type toggles from not increasing request to increasing request</p> <p>&gt; 250 Nm for engine torque based traction torque system, OR &gt; 4,000 Nm for axle torque based traction torque system</p>	<p>Active Communication with EBCM</p> <p>Power Mode Engine Running</p> <p>Status of traction in GMLAN message (\$4E9)</p> <p>Run/Crank Active</p> <p>Ignition Voltage</p>	<p>Received serial data</p> <p>= Run = True</p> <p>= Traction Present</p> <p>&gt; 0.50 seconds</p> <p>&gt; 6.41 volts</p>	<p>&gt;= 6 failures out of 10</p> <p>Performed on every received message</p> <p>6 rolling count failures out of 10 samples</p> <p>Performed on every received message</p> <p>&gt;= 3 multi- transitions out of 5 samples.</p> <p>Performed every 200 ms</p> <p>&gt;= 4 out of 10 samples</p> <p>Performed on every received message</p>	Type C, No SVS Emissio ns Neutral Diagnost ic - Type C

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  Gear Lever Position Sensor 2 Frequency error detection flag on X  OR  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  = True  > 12.00 %	Not Fault Active  Controller has been awake for at least  Cal must be equal to 6 to enable a type B DTC:	P089C, P089D  0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  Gear Lever Position Sensor 2 Frequency error detection flag on Y  OR  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  = True  > 12.00 %	Not Fault Active  Controller has been awake for at least  Cal must be equal to 6 to enable a type B DTC:	P08A1, P08A2  0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Cal must be equal to 6 to enable a type B DTC:	0.05 seconds  6.00	3.00 failures out of 4.00 samples  25 ms loop	DTC Type B Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Signal Message Counter Incorrect	P1000	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Reset Signal.	<p>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:</p> <p>Fuel Tank Zone Module Info 9 ARC</p> <p>Fuel Tank Zone Module Info 9 CSUM</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Signals Message Counter Incorrect	P1001	This DTC monitors for an error in communication with the Evaporative Emission (EVAP) System Signal.	<p>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:</p> <p>Fuel Tank Zone Module Info 11 ARC</p> <p>Fuel Tank Zone Module Info 11 CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Control System Signals Message Counter Incorrect	P1003	This DTC monitors for an error in communication with the Fuel Control System Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 12 ARC</p> <p>Fuel Tank Zone Module Info 12 CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Error	P1005	This DTC monitors for a reset error in the Fuel Pump Driver Control Module	If the received value for the time since the last FPDCM reset has reset and the newly received value or previous value is  for  out of total samples	  ≤ 0.50 seconds  ≥ 2.00 counts  ≥ 400.00 counts	DTC is enabled  Sensor bus relay  Battery voltage  P1000  U18A2	Enabled  On  > 11.00 Volts  Not active  Not active	Diagnostic runs in 50 ms loop.	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Temperature (Fuel Tank Zone Module) Too High Signal Message Counter Incorrect	P1009	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module (FTZM) Temperature Too High Signal Message.	<p>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:</p> <p>Fuel Tank Zone Module Info 7 ARC</p> <p>Fuel Tank Zone Module Info 7 CSUM</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Erratic	P100C	This DTC monitors for an erratic Temperature signal via LIN bus from the Battery Monitor Module.	Communication of the Temperature signal from the Battery Monitor Module has become erratic or is incorrect for  out of total samples	  >= 4 counts  >= 5 counts	The diagnostic is enabled  All the following conditions are met for:  Battery voltage  Accessory mode to off mode transition not pending  If controller is a non-OBD controller then battery voltage  Controller type: OBD Controller	Enabled  >= 3,000.00 milliseconds  >= 11.00 volts  <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Erratic	P100D	This DTC monitors for an erratic Temperature Circuit signal via LIN bus from the Battery Monitor Module.	Communication of the Temperature Circuit signal from the Battery Monitor Module has become erratic or is incorrect for  out of total samples	  >= 4 counts  >= 5 counts	The diagnostic is enabled  All the following conditions are met for:  Battery voltage  Accessory mode to off mode transition not pending  If controller is a non-OBD controller then battery voltage  Controller type: OBD Controller	Enabled  >= 3,000.00 milliseconds  >= 11.00 volts    <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V- W Circuit Open	P1029	<p>This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"]</p> <p>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</p>	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	<p>a) Sensed fuel pump speed</p> <p>b) Device configuration FCBR_e_ChassisFuelPre sSysType</p> <p>c) Diagnostic Enabled - KeFABR_b_OpenCktDiag Enbl</p> <p>d) CAN Sensor Bus message \$3EC_Avail</p> <p>e) Sensor Bus Relay On</p> <p>f) Sensor Bus B Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]</p>	<p>a) == 0 RPM</p> <p>b) CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys</p> <p>c) == TRUE</p> <p>d) == TRUE</p> <p>e) == TRUE</p> <p>f) &lt;&gt; TRUE</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	Type A, 1 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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. This open circuit diagnostic follows "smart device" Component Technical Specifications.						

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V- W Circuit Low	P102A	<p>This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground]</p> <p>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</p>	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	<p>a) Device configuration FCBR_e_ChassisFuelPre sSysType</p> <p>b) Diagnostic KeFABR_b_GshtCktDiag Enbl</p> <p>c) CAN Sensor Bus message \$3EC_Avail</p> <p>d) Sensor Bus Relay On</p> <p>e) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_A RC_ChkErr]</p>	<p>a) == CeFCBR_e_DSL_ECM_F TZM_BLDC_Sys</p> <p>b) == TRUE</p> <p>c) == TRUE</p> <p>d) == TRUE</p> <p>e) &lt;&gt; TRUE</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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].</p> <p>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 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.</p> <p>This open circuit diagnostic follows "smart device" Component Technical Specifications.</p>	Phased-pair circuit voltage	V [back-EMF] >= 6 V	<p>a) Sensed fuel pump speed</p> <p>b) Device configuration FCBR_e_ChassisFuelPre sSysType</p> <p>c) Diagnostic KeFABR_b_GshtCktDiag Enbl</p> <p>d) CAN Sensor Bus message \$3EC_Avail</p> <p>e) Sensor Bus Relay On</p> <p>f) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]</p>	<p>a) == 0 RPM</p> <p>b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys</p> <p>c) == TRUE</p> <p>d) == TRUE</p> <p>e) == TRUE</p> <p>f) &lt;&gt; TRUE</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V- W Circuit High	P102B	<p>This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery]</p> <p>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</p>	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	<p>a) Device configuration FCBR_e_ChassisFuelPre sSysType</p> <p>b) Diagnostic KeFABR_b_PshtCktDiag Enbl</p> <p>c) CAN Sensor Bus message \$3EC_Avail</p> <p>d) Sensor Bus Relay On</p> <p>e) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_A RC_ChkErr]</p>	<p>a) == CeFCBR_e_DSL_ECM_F TZM_BLDLDC_Sys</p> <p>b) == TRUE</p> <p>c) == TRUE</p> <p>d) == TRUE</p> <p>e) &lt;&gt; TRUE</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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].</p> <p>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 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.</p> <p>This open circuit diagnostic follows "smart device" Component Technical Specifications.</p>	Phased-pair circuit voltage	V[backEMF] > 6 V	<p>a) Sensed fuel pump speed</p> <p>b) Device configuration FCBR_e_ChassisFuelPre sSysType</p> <p>b) Diagnostic KeFABR_b_PshtCktDiag Enbl</p> <p>c) CAN Sensor Bus message \$3EC_Avail</p> <p>d) Sensor Bus Relay On</p> <p>e) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]</p>	<p>a) == 0 RPM</p> <p>b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys</p> <p>b) == TRUE</p> <p>c) == TRUE</p> <p>d) == TRUE</p> <p>e) &lt;&gt; TRUE</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wastegate Actuator "A" Control Circuit Shorted	P103A	Controller specific output driver circuit diagnostic, diagnosing for the 'electric waste gate actuator A' actuator' H-bridge driver load short failure. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver on state indicates a load short failure.	$\leq 0.5 \Omega$ impedance between motor output A and motor output B	Diagnostic enabled ***** Powertrain relay voltage ***** Engine does not crank Diagnostic system not disabled	True ***** $\geq 11.0$ Volts *****	10 failures out of 12 samples  100ms / sample	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	<p>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.</p> <p>The heater supply voltage input is connected to the O2 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the O2 heaters. The O2 heater voltage is used by the HWIO to calculate the O2 heater resistance on switching type O2 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage.</p> <p>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.</p>	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.00 volts	<p>Diagnostic is Enabled</p> <p>Powertrain relay in range (Relay in range is defined as relay voltage</p> <p>Run Crank signal active</p>	<p>= True</p> <p>&gt; 11.00 volts )</p> <p>= True</p> <p>(Please see "<b>Run/Crank Active conditions</b>" in Supporting Tables)</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Heater Supply Voltage Sense Circuit Low	P103C	<p>The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold.</p> <p>The heater supply voltage input is connected to the O2 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the O2 heaters. The O2 heater voltage is used by the HWIO to calculate the O2 heater resistance on switching type O2 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage.</p> <p>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.</p>	Heater Supply Voltage	< 6.00 volts	<p>Diagnostic is Enabled</p> <p>Powertrain relay in range (Relay in range is defined as relay voltage</p> <p>Run Crank signal active</p>	<p>= True</p> <p>&gt; 11.00 volts )</p> <p>= True</p> <p>(Please see "<b>Run/Crank Active conditions</b>" in Supporting Tables)</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Control Signal Message Counter Incorrect	P103D	This DTC monitors for an error in communication with the Engine Coolant Pump Control Signals.	<p>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:</p> <p>Main Coolant Pump ARC</p>	<p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Position Sensor Circuit Low	P1096	Circuit Continuity This DTC detects a short to ground in the position sensor signal circuit. This is accomplished by monitoring the reported position. If the position goes out of the expected range the DTC is set.	Engine Coolant Bypass Valve C Positions Sensor SENT digital read value	< 50	Diagnostic is Enabled  SENT communication is not in error  Run Crank Ignition in Range  Engine not cranking  Engine Diag System	VECR_MRV_LoC_FP  = True  = True  = Enabled	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Position Sensor Circuit High	P1097	Circuit Continuity This DTC detects a short to power in the position sensor signal circuit. This is accomplished by monitoring the reported position. If the position goes out of the expected range the DTC is set.	Engine Coolant Bypass Valve C Positions Sensor SENT digital read value	> 4,050	Diagnostic is Enabled  SENT communication is not in error  Run Crank Ignition in Range  Engine not cranking  Engine Diag System	VECR_MRV_LoC_FP  = True  = True  = Enabled	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Position Sensor Stop Performance	P1098	Performance Check This DTC checks for an invalid endstop learn. The valve is moved against each endstop. If the learned position is out of range a DTC will be set.	If any of the following conditions are met a failure will be recorded:  Condition 1 (closed): Learned bypass valve position or and the learn has completed  Condition 2 (open): Learned bypass valve position or and the learn has completed	> 0.00 degrees < -10.00 degrees           > 314.50 degrees < 304.50 degrees	Diagnostic is Enabled  No DTCs      Engine Diag System Bypass Valve Learn  Engine Outlet Coolant OR OBD Coolant Enable Criteria  Engine Outlet Coolant AND Engine Hot Light	EECR_EngineOutlet_FA VECR_MRV_LoC_FA VECR_MRV_PstnSnsrCkt _FA VECR_MRV_PstnSnsrCkt _TFTKO VECR_MRV_PstnPerf_FA  = Enabled = Successful or Inprogress  ≥ -40.0 °C  = TRUE  ≤ 9,999.0 °C  = Inactive	Within 60.0 seconds after engine shutdown.	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Motor Current High	P10A0	Controller specific output driver circuit detects an overcurrent condition in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Current measurement outside of controller specific acceptable range when H-Bridge is energized	$8.1A \leq X \leq 12.8A$	Diagnostic is Enabled  Run Crank Ignition in Range  Engine not cranking  Engine Diag System  Driver over current status is not	  = True  = True  = Enabled  = Indeterminate	2 seconds out of a 5 seconds window	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Control Circuit Shorted	P10A1	Controller specific output driver circuit detects a short to ground in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Current measurement outside of controller specific acceptable range when H-Bridge is energized	$9.8A \leq X \leq 15.8A$	Diagnostic is Enabled  Run Crank Ignition in Range  Engine not cranking  Engine Diag System  Driver control circuit load short status is not	  = True  = True  = Enabled  = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< <b>P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True          = True          > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> <b>P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True  = True  > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< <b>P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True          = True          > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> <b>P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True          = True          > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< <b>P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag _TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True          = True          > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> <b>P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True  = True  > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< <b>P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag _TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True          = True          > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> <b>P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  FULR_b_FPV_MeasDiag_TFTKO  Uncompensated Injection Pulse Width (Injection is commanded)	= True   = True   > 0	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor A / C Correlation	P10BC	<p>Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range.</p> <p>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.</p>	Difference between BARO A Sensor reading and BARO C Sensor reading	> 15.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Control Circuit Short	P10E8	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to low side when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	<= 1.1 or 15 Amps selectable threshold based on High pressure Pump.	Engine Speed Battery Voltage	<p>&gt;= 50 RPM &gt;= 11 Volts</p> <p>Not in pump device control Enabled when a code clear is not active or not exiting device control</p>	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Status Message Counter Incorrect	P10F5	This DTC monitors for an error in communication with the EVAP Purge Pump Status Message Signals.	<p>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:</p> <p>EVAP Purge Pump ARC</p>	<p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Signal Message Counter Incorrect	P1100	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 2 Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 4 ARC</p> <p>Fuel Tank Zone Module Info 4 CSUM</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (single turbo)	P1101	<p>Detects a performance failure in the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure 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.</p> <p>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors.</p> <p>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</p>	<p>See table <b>P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</b> for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -</p>	<p>&gt; 20.0 grams/sec</p> <p>&gt; 25.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 250 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>&gt;= 400 RPM &lt;= 6,200 RPM</p> <p>&gt;= -9 Deg C</p> <p>= TRUE)</p> <p>&lt;= 130 Deg C</p> <p>= FALSE)</p> <p>&gt;= -20 Deg C &lt;= 100 Deg C</p> <p>&gt;= 0.50</p> <p>Modeled Air Flow Error multiplied by <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM</b> and <b>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est</b></p> <p>MAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</b></p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.	<p>measured MAP - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</b></p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</b></p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>&gt; 30.0 kPa</p> <p>&gt; 30.0 kPa</p> <p>&gt; 1.0 seconds</p> <p>&gt; 1.0 seconds</p> <p>&gt; a threshold in gm sec as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow</b></p>	<p>No Active DTCs:</p> <p>No Pending DTCs:</p>	<p>MAP Model 2 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</b></p> <p>MAP Model 3 Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</b></p> <p>TIAP Model 1 Error multiplied by <b>P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</b></p> <p>Filtered Throttle Model Error multiplied by <b>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</b></p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p>&gt; a threshold in kPa as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</b></p> <p>&lt; 3.0 gm/sec</p> <p>&lt; a threshold in gm sec as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</b></p> <p>&lt; a threshold in kPa as a function of engine speed See table <b>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</b></p> <p>&lt; 3.0 gm/sec</p>	Diagnostic is Enabled	MnfdTempSensorCktFP		



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor Not Plausible	P111E	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.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCInSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfidAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSn</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_EngineOutlet_Ckt FA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_Ckt FA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_Ckt FA</p> <p>EECR_HeaterCoreInlet_C ktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_Ck tFA</p> <p>EECR_BypassInlet_CktF A</p> <p>EECR_CylHeadMetal1_C ktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b>  CeEECR_e_PhysSnsr2  Comparison sensor 1:  CeEECR_e_BiasChkEngOilSnsr  Comparison sensor 2:  CeEECR_e_BiasChkManfldAirSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterNoEffect  Block Heater:  CeEECR_e_AuxHeaterBiasHigh  Threshold A:  Threshold B:</p> <p><b>Engine Block:</b>  CeEECR_e_PhysSnsr7  Comparison sensor 1:  CeEECR_e_BiasChkCylHdCIntSnsr  Comparison sensor 2:  CeEECR_e_BiasChkEngOilSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterNoEffect  Block Heater:  CeEECR_e_AuxHeaterBiasBoth  Threshold A:  Threshold B:</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr</p> <p>Comparison sensors =====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Engine Block:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Engine Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Head Coolant:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Heater Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Heater Outlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p>	<p>EGRTempSensorUPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

## 210BDG03D ECM Summary Tables

[illegible]

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_BiasChkMa nflAirSnr</p> <p>Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect</p> <p>Block Heater: CeEECR_e_AuxHeaterBi asHigh</p> <p>Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnr5 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnr Comparison sensor 2: CeEECR_e_BiasChkMa nflAirSnr</p> <p>Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect</p> <p>Block Heater: CeEECR_e_AuxHeaterBi asBoth</p> <p>Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnr3 Comparison sensor 1: CeEECR_e_BiasChkEng InCntSnr Comparison sensor 2: CeEECR_e_BiasChkMa nflAirSnr</p> <p>Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect</p> <p>Block Heater: CeEECR_e_AuxHeaterBi asLow</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p>	<p>There are 4 different types of aux heater detection for this application:</p> <p>2x2 signature Absolute Drop IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b></p> <p>The warm sensors Sensor 1: Sensor 2:</p> <p>The cool sensors Sensor 1: Sensor 2:</p> <p>A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b></p> <p>The is monitored for a drop.</p> <p>The drop will be monitored for once coolant flow is</p>	<p>&gt; -9.00 °C</p> <p>Enabled Enabled Disabled Disabled</p> <p>CeAEHR_e_BlkHtrCylHd CntSnr CeAEHR_e_BlkHtrEngIn CntSnr</p> <p>CeAEHR_e_BlkHtrRadO utCntSnr CeAEHR_e_BlkHtrOutsid eAirSnr</p> <p>10.0 °C</p> <p>10.0 °C</p> <p>&gt; 10.0 °C</p> <p>CeAEHR_e_BlkHtrBlock CntSnr</p> <p>&gt; 9.00 L/min</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met. Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>30.00 °C 17.00 °C</p> <p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p> <p>A block heater is detected if a drop is</p> <p><b>IAT Drop Criteria:</b></p> <p>The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b></p> <p>Derivative will be monitored using</p>	<p>0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p> <p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C ≥ 400.0 seconds ≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds &gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock CIntSnsr</p>		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for  Derivative count will increment if derivative is  If counts are a block heater is detected =====	> -1.00 L/min  5.0 - 15.0 seconds  < 75.0 seconds  > 300.0 seconds  < -0.10 °C/sec  ≥ 4 counts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 sensor1 and sensor2)	> 20.00 degC	<p>Fuel Temperature Rationality Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending on</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182)</p> <p>Temperature sensors 2 out of range Low or High (P0187, P0188)</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Intenal Error Fault Active (P126E, P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D)</p> <p>SENT Communication Fault Pending (U0625, U101B, U0670, U0671)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)</p>	<p>100.00 failures out of 125.00 samples</p> <p>100 ms per Sample Continuous</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temperature Sensor Not Plausible	P112F	This DTC detects either a biased high or low RCT (Radiator Coolant Temperature) sensor. This is done by comparing the RCT sensor output to two other temperature sensor outputs after a soak condition.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: RadiatorCoolantTempSnsr</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCInSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>-</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_RadiatorOutlet_Ck tFA</p> <p>EECR_CylHeadCoolant_ CktFA</p> <p>EECR_BlockCoolant_Ckt FA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_Ckt FA</p> <p>EECR_HeaterCoreInlet_C ktFA</p> <p>EECR_HeaterCoreOutlet_ CktFA</p> <p>EECR_RadiatorOutlet_Ck tFA</p> <p>EECR_BypassInlet_CktF A</p> <p>EECR_CylHeadMetal1_C ktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_F A</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b>  CeEECR_e_PhysSnsr2  Comparison sensor 1:  CeEECR_e_BiasChkEngOilSnsr  Comparison sensor 2:  CeEECR_e_BiasChkManfldAirSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterNoEffect  Block Heater:  CeEECR_e_AuxHeaterBiasHigh  Threshold A:  Threshold B:</p> <p><b>Engine Block:</b>  CeEECR_e_PhysSnsr7  Comparison sensor 1:  CeEECR_e_BiasChkCylHdCIntSnsr  Comparison sensor 2:  CeEECR_e_BiasChkEngOilSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterNoEffect  Block Heater:  CeEECR_e_AuxHeaterBiasBoth  Threshold A:</p>	<p>20.00 °C 10.00 °C</p> <p>30.00 °C</p>	<p>BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Engine Block:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Engine Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Head Coolant:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Heater Inlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Heater Outlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p> <p><b>Radiator Outlet:</b>  Propulsion Off Soak Time  Ambient Air Temperature</p>	<p>EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Threshold B:</p> <p><b>Engine Inlet:</b>  CeEECR_e_PhysSnsr1  Comparison sensor 1:  CeEECR_e_BiasChkRad  OutCIntSnsr  Comparison sensor 2:  CeEECR_e_BiasChkMa  nflAirSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterN  oEffect  Block Heater:  CeEECR_e_AuxHeaterBi  asHigh  Threshold A:  Threshold B:</p> <p><b>Head Coolant:</b>  CeEECR_e_PhysSnsr6  Comparison sensor 1:  CeEECR_e_BiasChkBlo  ckCIntSnsr  Comparison sensor 2:  CeEECR_e_BiasChkEng  OilSnsr  Fuel Operated heater:  CeEECR_e_AuxHeaterN  oEffect  Block Heater:  CeEECR_e_AuxHeaterBi  asBoth  Threshold A:  Threshold B:</p> <p><b>Heater Inlet:</b>  CeEECR_e_PhysSnsr4  Comparison sensor 1:  CeEECR_e_BiasChkByp  InCIntSnsr  Comparison sensor 2:</p>	<p>10.00 °C</p> <p>25.00 °C</p> <p>17.00 °C</p> <p>20.00 °C</p> <p>10.00 °C</p>	<p>=====</p> <p>Comparison sensor 1 &amp; 2 are not</p> <p>=====</p> <p>Aux Heat Detection</p> <p>Aux heat detection can only be enabled the following are met:</p> <p>No Active DTCs</p> <p>At power-up a warm sensor and cool sensor are compared</p> <p>Warm sensor</p> <p>Cool sensor</p> <p>If the warm sensor is compared to the cool sensor</p> <p>Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature</p> <p>There are 4 different types of aux heater detection for this</p>	<p>=</p> <p>CeEECR_e_BiasChkNoS election</p> <p>Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA</p> <p>CeAEHR_e_BlkHtrBlock CIntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr</p> <p>&gt; 10.00 °C</p> <p>&gt; 0 seconds &gt; 28,800 seconds &gt; -9.00 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:	15.00 °C 10.00 °C	application:  2x2 signature Absolute Drop IAT Drop Temperature Derivative  <b>2x2 Signature Criteria:</b>  The warm sensors  Sensor 1:  Sensor 2:  The cool sensors  Sensor 1:  Sensor 2:	Enabled Enabled Disabled Disabled   CeAEHR_e_BlkhTrCylHd ClntSnsr CeAEHR_e_BlkhTrEngIn ClntSnsr   CeAEHR_e_BlkhTrRadO utClntSnsr CeAEHR_e_BlkhTrOutsid eAirSnsr		
			CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:	25.00 °C 17.00 °C	A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)	10.0 °C  10.0 °C  > 10.0 °C		
			<b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asl ow		<b>Absolute Drop Criteria:</b>  The is monitored for a drop.  The drop will be monitored for once coolant flow is AND	CeAEHR_e_BlkhTrBlock ClntSnsr   > 9.00 L/min		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met. Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>30.00 °C 17.00 °C</p> <p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p> <p>A block heater is detected if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b></p> <p>Derivative will be monitored using</p> <p>Derivative will be</p>	<p>0.0 - 60.0 seconds</p> <p>&lt; 120.0 seconds</p> <p>&gt; 300.0 seconds</p> <p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock ClntSnsr</p>		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for  Derivative count will increment if derivative is  If counts are a block heater is detected =====	> -1.00 L/min  5.0 - 15.0 seconds  < 75.0 seconds  > 300.0 seconds  < -0.10 °C/sec  ≥ 4 counts		

## 21OBDG03D ECM Summary Tables

<b>Component/ System</b>	<b>Fault Code</b>	<b>Monitor Strategy Description</b>	<b>Malfunction Criteria</b>	<b>Threshold Value</b>	<b>Secondary Parameters</b>	<b>Enable Conditions</b>	<b>Time Required</b>	<b>MIL Illum.</b>
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	> 92.25 Percent	Diagnostic is enabled	Enabled	Executes in 12.5ms loop.	Type B, 2 Trips
			or		Run/Crank Ignition Voltage	>= 11.00 Volts		
			Raw Fuel Pump Driver Control Module 5V Reference 1 is	< 87.75 Percent	U0076	Is not active		
			or		PT Sensor Bus Relay	Commanded on (if present)		
			Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is	> 0.90 Percent	Communication with the Fuel Tank Zone Module is not lost			
			For a non-continuous failure of	40.00 counts				
			out of	80.00 counts				
			For a continuous failure of	0.20 seconds				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  or  Raw Fuel Pump Driver Control Module 5V Reference 2 is  or  Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 2 and Raw Fuel Pump Driver Control Module 5V Reference 2 is  For a non-continuous failure of  out of  For a continuous failure of	> 92.25 Percent          < 87.75 Percent          > 0.90 Percent    40.00 counts  80.00 counts  0.20 seconds	Diagnostic is enabled  Run/Crank Ignition Voltage  U0076  PT Sensor Bus Relay   Communication with the Fuel Tank Zone Module is not lost	Enabled  >= 11.00 Volts  Is not active  Commanded on (if present)	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  or  Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is  or  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  For a non-continuous failure of  out of  For a continuous failure of	 > 92.25 Percent          < 87.75 Percent       > 0.90 Percent   40.00 counts  80.00 counts  0.20 seconds	Diagnostic is enabled  Run/Crank Ignition Voltage  U0076  PT Sensor Bus Relay  Communication with the Fuel Tank Zone Module is not lost	Enabled  >= 11.00 Volts  Is not active  Commanded on (if present)	Executes in 50.0ms loop.	Type B, 2 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	P1179	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is  or  Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is  or  Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is  For a non-continuous failure of  out of  For a continuous failure of	> 92.25 Percent             40.00 counts  80.00 counts  0.20 seconds	Diagnostic is enabled  Run/Crank Ignition Voltage  U0076  PT Sensor Bus Relay  Communication with the Fuel Tank Zone Module is not lost	Enabled  >= 11.00 Volts  Is not active  Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve D Control Signal Message Counter Incorrect	P117A	This DTC monitors for an error in communication with the Engine Coolant Bypass Valve D Control Signals.	<p>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:</p> <p>Engine Coolant Bypass Valve D ARC</p>	<p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Block Coolant Valve Position Sensor Circuit Low Voltage	P118A	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too low and out of the expected operating range, defined by any position below the lower mechanical end-stop. If the enable criteria are met and the raw position feedback is below the out of range low position fail 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. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	< -7.00 °	Diagnostic is Enabled  12V System Voltage  VECR_BRV_PstnFdbk_A V VECR_BRV_PstnFdbk_F ol  PowertrainRelayStateOn_ FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690  Powertrain Relay Commanded On  Diagnostic Position Override Enable	>= 11.00 V (hysteresis disable < 10.00 V)  = No Fault Pending  = No Fault Active  = True  = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Block Coolant Valve Position Sensor Circuit High Voltage	P11C9	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too high and out of the expected operating range, defined by any position above the upper mechanical endstop. If the enable criteria are met and the raw position feedback is greater than the out of range high fail 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. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	> 117.00 °	Diagnostic is Enabled  12V System Voltage  VECR_BRV_PstnFdbk_A V VECR_BRV_PstnFdbk_F ol  PowertrainRelayStateOn_ FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690  Powertrain Relay Commanded On  Diagnostic Position Override Enable	>= 11.00 V (hysteresis disable < 10.00 V)  = No Fault Pending  = No Fault Active  = True  = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Signal Message Counter Incorrect	P1200	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 1 Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 3 ARC</p> <p>Fuel Tank Zone Module Info 3 CSUM</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure.</p> <p>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.</p>	25 amp >= through low side driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over- temperature condition exists under normal operating conditions.  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 enabled [KeFABR_b_OvertempDia gEnbl]  b) Sensor Bus Relay On  c) CAN Sensor Bus message \$3EC_Available  d) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_A RC_ChkErr]	a) == TRUE  b) == TRUE  c) == TRUE  d) <> TRUE	5.00 failures / 10.00 samples  1 sample / 100 millisec	Type B, 2 Trips

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# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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          No Fault Pending on	Enabled when a code clear is not active or not exiting device control  SENT Communication Fault Active (U0625, U101B, U0670, U0671)  Fuel Temperature Sensor SENT Message Error Fault Active (P128D)  Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples  100 ms per Sample Continuous	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	<p>This DTC diagnose SENT high pressure sensor 2 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	High Pressure Rail Sensor 2 SENT digital read value	=< 66			Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  No Fault Pending	Enabled when a code clear is not active or not exiting device control  True  U0625 P16E5 P128F	400 failures out of 500 samples  6.25 ms per Sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  No Fault Pending	Enabled when a code clear is not active or not exiting device control  True  U0625 P16E5 P128F	400 failures out of 500 samples  6.25 ms per Sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  SENT power up delay  No Fault Active	True  >= 0.00 seconds  U0625 P16E5	134 failures out of 167 samples  6.25 ms per sample Continuous	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  SENT power up delay  No Fault Active	True  >= 0.00 seconds  U0625 P16E5	134 failures out of 167 samples  6.25 ms per sample Continuous	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 SENT HWIO 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)  Message Age	= true  > 1.69 ms	SENT signal Serial waveform diagnostics enable  SENT power up delay    No Fault Active on	True   >= 0.00 seconds  Enabled when a code clear is not active or not exiting device control  U0625 P16E5	400 failures out of 500 samples  6.25 ms per sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage Low (Only on applications that use an FTZM)	P129B	Detects low voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage drops below a calibrated value.	Fuel Pump Driver Control Module System Voltage Low	Fuel Tank Zone Module (FTZM) Battery Voltage <= 9.00	Fuel Tank Zone Module (FTZM) is present on vehicle  Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled  Fuel Tank Zone Module (FTZM) serial messages are available  Starter motor not engaged  Sensor Bus relay is commanded ON	= 1	400 failures out of 500 samples  12.5 ms / sample	Type C, No SVS

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module System Voltage High (Only on applications that use an FTZM)	P129C	Detects high voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage exceeds a calibrated value.	Fuel Pump Driver Control Module System Voltage High	Fuel Tank Zone Module (FTZM) Battery Voltage >= 18.00	Fuel Tank Zone Module (FTZM) is present on vehicle  Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled  Fuel Tank Zone Module (FTZM) serial messages are available  Sensor Bus relay is commanded ON	= 1	400 failures out of 500 samples  12.5 ms / sample	Type C, No SVS

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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] <b>P129F Threshold Low</b>  OR  < Speed Error High Threshold [Supporting Table] <b>P129F Threshold High</b>	a) Diagnostic Enabled FABR Speed Rationality Diagnostic b) CAN Sensor Bus message \$0CB_Available c) FABR Fuel Control Enable Fault Active d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B \$0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr] e) FABR Fuel Pump Ckt FA f) FABR Driver OverTemp FA g) Run_Crank input Voltage h) Sensor Bus Relay On j) CAN Sensor Bus message \$0CB Data Fault [CFMR_b_FTZM_Info8_ARC_ChkErr] k) CAN Sensor Bus message \$0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA] l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA] m) Timer - FABR Rising Edge Diagnostic Delay n) Timer - FABR Falling Edge Diagn Delay	a) == TRUE  b) == TRUE  c) <> TRUE  d) <> TRUE   e) <> TRUE f) <> TRUE  g) > 9.00 volts  h) == TRUE j) <> TRUE    k) <> TRUE   l) <> TRUE   m) > 2.30 seconds  n) > 0.90 seconds	1 sample / 12.5 msec	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Tank Zone 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  [Fuel Tank Zone Module device]	<> Fuel Control Enable Active command  [serial data]	a) Diagnostic enabled [KeFABR_b_FuelCntrlEnbIDiagEnbl]  b) Sensor Bus message \$0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr]  c) CAN Sensor Bus message \$0CC_Available  d) Sensor Bus Relay On  e) Timer [FABR_t_RunCrankActive]	a) == TRUE  b) <> TRUE  c) == TRUE  d) == TRUE  e) >= 0.51 seconds	40.00 failures / 80.00 samples  1 sample / 12.5 millisec	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (Fuel Tank Zone Module) Control Signal Message Counter Incorrect	P12A8	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Control Signal Message.	<p>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:</p> <p>Fuel Tank Zone Module Info 8 ARC</p> <p>Fuel Tank Zone Module Info 8 CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Run/ Start Voltage Signal Message Counter Incorrect	P130F	This DTC monitors for an error in the Ignition Run/Start Voltage Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 5 ARC</p> <p>Fuel Tank Zone Module Info 5 CSUM</p>	<p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Torque Solver Performance	P134C	The performance of internal control module torque solver is monitored by the iteration number required to complete the computation as well as comparison of the values determined by the solver against constraints. The torque solver performance is monitored only if the torque control is enabled.	<p>Reported iteration number exceeds threshold.</p> <p>Internal control module torque solver requires a certain number of iterations to complete the computation. During normal operation, this number should be smaller than a pre-defined threshold.</p> <p>Two cases are considered as failure:</p> <p>1) the computation is not completed when the iteration number exceeds the threshold. The reported iteration number is set equal to 1+ maximum number of iterations allowed for the torque solver.</p> <p>2) the computation is not completed before overrunning the control loop. In this case, the reported iteration number is set equal to the sum of the current iteration number and maximum number of iterations allowed for the torque solver.</p>	> refer to <b>Maximum number of iterations allowed for torque solver</b> in supporting tables	Diagnostic enabled and Control module resource monitor enabled	= Enabled = Enabled	5.00 failures out of 8.00 samples  25 ms / sample	Type B, 2 Trips
			Reported solution exceeds lower/upper bounds by more than allowed value.	Solution minus lower bound < - 10.00  or	Diagnostic enabled	= Enabled	5.00 failures out of 8.00 samples  25ms / sample	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>If not in Case 1 or Case 3, the solution determined by internal control module torque solver should remain higher or equal to pre-determined lower bound and lower or equal to pre-determined upper bound.</p> <p>Due to the nature of floating point computation in ECM (engine control module), the solution is allowed to exceed its lower/upper bounds by a value determined by the threshold. Exceeding lower/upper bounds by more than allowed value is considered as failure.</p>	Solution plus upper bound > 10.00 .				
			<p>Reported iteration number is negative.</p> <p>The normal range of iteration number that allows the internal control module torque solver to find a solution is between 0 and maximum number of iterations allowed. The reported iteration number becomes negative in the following two cases which are both considered as failure:</p> <p>1) the torque solver</p>	Reported iteration number < 0.	Diagnostic enabled	= Enabled	1 failure	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>cannot further proceed before finding a solution AND before the iteration number reaches maximum allowed value. In this case, the reported iteration number is set equal to the negative of the current iteration number.</p> <p>2) the torque solver returns a solution and is not in Case1, but the solution is not accurate due to error accumulation of floating point computation. In this case, the reported iteration number is set equal to the negative of the current iteration number minus the maximum allowed iteration number minus 1.</p>					

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Coil Positive Voltage Circuit Group 1 * * SIDI 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	<p>Diagnostic Enabled?</p> <p>Three possible Ignition Coil Power Sources (only 1 used):</p> <p>Ignition Coil Power Source =</p> <p><u>Case 1: Battery</u> Delay starting at Key-On</p> <p><u>Case 2: Ignition Run/Crank</u> Ignition Run/Crank Voltage</p> <p><u>Case 3: PT Relay</u> PT Relay Voltage</p>	<p>Yes</p> <p>PT Relay (Case 3)</p> <p>5 Engine Revs</p> <p>&gt; 5.0 volts</p> <p>&gt; 11.0 volts</p>	<p>24 Failures out of 30 Samples</p> <p>6.25 msec rate</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Status Signals Message Counter Incorrect	P135C	This DTC monitors for an error in communication with the Cooling Fan 1 Status Signals.	<p>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:</p> <p>Coolant Fan 1 ARC</p>	<p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Block Coolant Valve Stop Performance	P1387	This is an intrusive diagnostic that runs at the end of every drive cycle for detecting the valve hardware integrity. The valve is commanded to both the lower range and upper range boundary. If the valve hardware is not broken, the valve shall return feedback at the endstop positions. Otherwise, the feedback will return out of range feedback. A diagnostic determination is reported at the completion of the procedures. If both endstops return pass, then a PASS is reported, If any of the endstops returns a fail, then a FAIL is reported.	<b>Lower Endstop:</b> Coolant Valve Position Feedback  <b>Upper Endstop:</b> Coolant Valve Position Feedback	$\leq -7.00^{\circ}$  $\geq 117.00^{\circ}$	Diagnostic is Enabled  12V System Voltage  No pending DTCs  No Active DTCs  Powertrain Relay Commanded On  Engine Block Coolant Temperature is Used on this application  Run Crank Active  Coolant System Mode	$\geq 11.00$ V (hysteresis disable $< 10.00$ V)  VECR_BRV_PstnFdbk_A v VECR_BRV_PstnFdbk_F ol  PowertrainRelayStateOn_ FA Powertrain Relay Feedback Circuit DTCs P0689, P0690  = True  $\geq -40.00^{\circ}\text{C}$ (hysteresis disable $\leq -41.00^{\circ}\text{C}$ )  = False  = Coolant System Initialization	Both endstop tests occur in series and both must complete before a decision is made.  <b>Lower Endstop:</b> 4 seconds out of a 5 seconds window  <b>Upper Endstop:</b> 4 seconds out of a 5 seconds window	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure High Control Circuit Low	P13B1	Controller specific output driver circuit diagnoses the oil pump 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to Ground Circuit $\leq 0.5 \Omega$ impedance between output and controller ground	Powertrain Relay Voltage  Run/Crank Active  Cranking State	$\geq 11.00$  = True  = False	$\geq 40$ errors out of 50 samples.  Performed every 100 msec	Type A, 1 Trips  Note: In certain controlle rs P06DA may also set (Oil Pump Control Circuit Open)



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	<p>Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst)</p> <p>Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst)</p> <p>(EWMA filtered)</p> <p>Average Power = output of <b>P1400_EngineSpeedResidual_Table</b> * output of <b>P1400_SparkResidual_Table</b> NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumulated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details</p>	<p>&lt; -32.00 KJ/s (high RPM failure mode)</p> <p>&gt; 15.50 KJ/s (low RPM failure mode)</p>	<p>To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:</p> <p>Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure</p> <p>The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:</p> <p>Catalyst Temperature AND Engine Run Time</p> <p>OR</p> <p>Engine Run Time</p> <p>OR</p> <p>Barometric Pressure</p>	<p>&lt; 500.00 degC AND &gt; -12.00 degC AND &lt;= 72.00 degC AND &gt;= 72.00 KPa</p> <p>&gt;= 700.00 degC AND &gt;= 0.00 seconds</p> <p>&gt; <b>P1400_CatalystLightOffExtendedEngineRunTimeExit</b></p> <p>This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.</p> <p>&lt; 72.00 KPa</p>	<p>Runs once per trip when the cold start emission reduction strategy is active</p> <p>Frequency: 100ms Loop</p> <p>Test completes after 12 seconds of accumulated qualified data.</p>	EWMA Based - Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Other Enable Criteria:</p> <p>OBD Manufacturer Enable Counter</p> <p>Vehicle Speed</p> <p>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</p> <p>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:</p> <p>Pedal Close Delay Timer</p> <p>the diagnostic will continue the calculation.</p> <p>A change in gear will initiate a delay in the calculation of the average qualified residual value to</p>	<p>0</p> <p>&lt; 1.24 MPH</p> <p>0</p> <p>(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)</p> <p>&gt; 3.50 seconds</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:</p> <p>Gear Shift Delay Timer</p> <p>the diagnostic will continue the calculation</p> <p>For Manual Transmission vehicles:</p> <p>Clutch Pedal Position</p> <p>Clutch Pedal Position</p> <p>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.</p> <p>The time weighting factor must be :</p>	<p>&gt; 2.00 seconds</p> <p>&gt; 90.00 %</p> <p>&lt; 16.00 %</p> <p>&gt; 0 These are scalar values that are a function of engine run time. Refer to</p>		

21OBDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor A Reference Feedback Range/ Performance  [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  [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millise	a) CAN serial data available [\$2D7]  b) Calibration - Reference Voltage Command Source  c) Timer - Reference Voltage Pulse Width Available Synchronization  d) Timer - Reference Voltage Period Available Delay  e) Diagnostic System Disabled  f) FTZM Serial Data Info4 Rolling Counter Check Error  g) Reference Voltage Performance 0 Diagnostic Enabled	a) == True  b) == ECM  c) > 1.25 sec  d) > 0.75 sec  e) <> True  f) <> True  g) == TRUE	250 ms / sample	Type B, 2 Trips
			Reference Voltage 0 Pulse Width Error Maximum  [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millise	a) CAN serial data available [\$2D7]  b) Calibration - Reference Voltage Command Source  c) Timer - Reference Voltage Pulse Width Available Synchronization  d) Timer - Reference Voltage Period Available Delay  e) Diagnostic System Disabled	a) == True  b) == ECM  c) > 1.25 sec  d) > 0.75 sec  e) <> True	250 ms / sample  16 Failures / 20 Samples	

210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor B Reference Feedback Range/ Performance  [For use on vehicles with FTZM and Secondary Fuel Tank]	P143E	This DTC will detect a fault in Secondary 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 1 Period Error Maximum  [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millise	a) CAN serial data available [\$2D7]  b) Calibration - Reference Voltage Command Source  c) Timer - Reference Voltage Pulse Width Available Synchronization  d) Timer - Reference Voltage Period Available Delay  e) Diagnostic System Disabled  f) FTZM Serial Data Info4 Rolling Counter Check Error  g) Reference Voltage Performance 1 Diagnostic Enabled	a) == True  b) == ECM  c) > 1.25 sec  d) > 0.75 sec  e) <> True  f) <> True  g) == TRUE	250 ms / sample  16 Failures / 20 Samples	Type B, 2 Trips
			Reference Voltage 1 Pulse Width Error Maximum  [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millise	a) CAN serial data available [\$2D7]  b) Calibration - Reference Voltage Command Source  c) Timer - Reference Voltage Pulse Width Available Synchronization  d) Timer - Reference Voltage Period Available Delay  e) Diagnostic System Disabled	a) == True  b) == ECM  c) > 1.25 sec  d) > 0.75 sec  e) <> True	250 ms / sample  16 Failures / 20 Samples	

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					f] FTZM Serial Data Info4 Rolling Counter Check Error  g] Reference Voltage Performance 1 Diagnostic Enabled	f] <> True  g] == TRUE		



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump On Speed Performance	P1467	Purge pump speed does not match requested pump speed when pump is commanded on	<p>Purge pump speed</p> <p>Purge pump speed</p>	<p>&gt; refer to <b>Purge pump speed on value too high</b> in Supporting Tables. Calibration threshold for pump speed too high as func of pump supply voltage</p> <p>&lt; refer to <b>Purge pump speed on value too low</b> in Supporting Tables. Calibration threshold for pump speed too low as func of pump supply voltage</p>	<p>Diagnostic is Enabled</p> <p>Propulsion system on</p> <p>Purge pump commanded on</p> <p>LIN data available for</p> <p>Outside Air Temp</p> <p>Powertrain relay voltage</p> <p>Barometric pressure</p> <p>Time delay</p> <p>Purge Pump Over Temperature Status</p> <p>No active DTCs</p>	<p>≥ 2 counts</p> <p>≥ -20 °C</p> <p>≥ 11.0 volts</p> <p>≥ 70 kPa</p> <p>≥ 14 seconds for purge pump speed to spool up (pump off to on)</p> <p>= False</p> <p>P1469 - Purge Pump Speed OOR Low</p> <p>P146A - Purge Pump Speed OOR High</p> <p>P148E - Purge Pump Voltage OOR Low</p> <p>P148F - Purge Pump Voltage OOR High</p> <p>P1490 - Purge Pump Voltage Performance</p> <p>P14A4 - EVAP Purge Pump Temperature Too High</p>	<p>100 failures out of 125 samples</p> <p>100 msec / sample</p>	Type B, 2 Trips

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending DTC's	LIN Communication Fault Active AmbientAirDefault OAT_AmbientSensorFA  P1469 - Purge Pump Speed OOR Low  P146A - Purge Pump Speed OOR High  LIN Communication Fault Pending		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Off Speed Performance	P1468	Purge pump speed does not match requested pump speed when pump is commanded off	Absolute value of purge pump speed	> 240 RPM	Diagnostic is Enabled  Propulsion system on  Purge pump commanded off  LIN data available for  Powertrain relay voltage  Time delay  No active DTCs          No pending DTC's	≥ 2 counts  ≥ 11.0 volts  ≥ 21 seconds for purge pump speed to spool up (pump on to off)  P1469 - Purge Pump Speed OOR Low Fault Active  P146A - Purge Pump Speed OOR High Fault Active  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  P1490 - Purge Pump Voltage Performance  LIN Communication Fault Active  P1469 - Purge Pump Speed OOR Low  P146A - Purge Pump Speed OOR High	50 failures out of 63 samples  100 msec / sample	Type B, 2 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						LIN Communication Fault Pending		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Speed Too Low	P1469	Purge pump speed signal is out of range low	Purge pump speed	< -100 RPM	Diagnostic is Enabled  LIN data available for  Powertrain relay voltage  No active DTCs       No pending DTC's	≥ 2 counts  ≥ 11.0 volts  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  P1490 - Purge Pump Voltage Performance  LIN Communication Fault Active  LIN Communication Fault Pending	50 failures out of 63 samples  100 msec / sample	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Speed Too High	P146A	Purge pump speed signal is out of range high	Purge pump speed	> 55,000 RPM	Diagnostic is Enabled  LIN data available for  Powertrain relay voltage  No active DTCs       No pending DTC's	≥ 2 counts  ≥ 11.0 volts  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  P1490 - Purge Pump Voltage Performance  LIN Communication Fault Active  LIN Communication Fault Pending	50 failures out of 63 samples  100 msec / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump System Performance  (Continuous Flow Version)	P146B	<p>Purge pump system flow performance, based on pressure sensor feedback, is too low or too high.</p> <p>A purge system, that employs a purge pump, will monitor the purge flow delivery through the evaporative emission system. The estimated purge flow is calculated as a function of pressure across the purge solenoid valve. The failure threshold purge flow is calculated as a function of purge valve duty cycle and barometric pressure. The ratio of the estimated purge flow and failure threshold purge flow is calculated and compared to a threshold. A fault pending is set when the calculated ratio is greater than or less than calibration thresholds. These fault pending states are processed by X out of Y logic.</p>	<p>Purge pump flow ratio low</p> <p>Purge pump flow ratio low = estimated purge flow as a function of pressure across purge solenoid valve / failure threshold for purge low flow as a function of purge valve duty cycle and barometric pressure</p> <p>Purge pump flow ratio high</p> <p>Purge pump flow ratio high = estimated purge flow as a function of pressure across purge solenoid valve / failure threshold for purge high flow as a function of purge valve duty cycle and barometric pressure</p>	<p>&lt; refer to <b>Purge pump performance low flow ratio threshold</b> in Supporting Tables. Calibration threshold for performance too low as func of purge valve duty cycle and barometric pressure</p> <p>&gt; refer to <b>Purge pump performance high flow ratio threshold</b> in Supporting Tables. Calibration threshold for performance too high as func of purge valve duty cycle and barometric pressure</p>	<p>Diagnostic is Enabled</p> <p>Propulsion system on</p> <p>Conditions for Estimated Ambient Temperature Using OAT Sensor to be Valid (read description for details)</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature</p> <p>Barometric Pressure</p> <p>Pump speed on timer</p> <p>No device control</p> <p>Averaging of pump pressure sensor reading is valid</p> <p>Purge is enabled</p> <p>EVAP diagnostics are not running (This means purge valve leak (P0496), large leak (P0455), and canister vent restriction (P0446) diagnostics have completed or did not need to run) and delay timer</p> <p>LIN data available for</p> <p>LIN IAT data available</p> <p>Powertrain relay voltage</p>	<p>= TRUE</p> <p>&gt; 0 °C</p> <p>&lt; 50 °C</p> <p>≥ 70 kPa</p> <p>≥ 14 seconds</p> <p>= TRUE</p> <p>= TRUE</p> <p>&gt; 5.0 Seconds</p> <p>≥ 2 counts</p> <p>≥ 11.0 volts</p>	<p>80 failures out of 100 samples</p> <p>100 msec / sample</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>When entering or re-entering the enable criteria in this section a delay timer needs to expire</p> <p>Engine RPM to enable Engine RPM to remain enabled</p> <p>Engine airflow to enable Engine airflow to remain enabled</p> <p>Purge solenoid DC to enable Purge solenoid DC to remain enabled</p> <p>Purge gas flow ratio to enable</p> <p>Purge gas flow ratio to remain enabled</p> <p>Purge flow to enable Purge flow to remain enabled</p> <p>Induction vacuum to</p>	<p>*****</p> <p>&gt; 1.0 Seconds</p> <p>400 RPM ≤X≤ 6,800 RPM 350 RPM ≤X≤ 6,850 RPM</p> <p>0 g/s ≤X≤ 30 g/s -5 g/s ≤X≤ 35 g/s</p> <p>5 ≤X≤ 101 % 2 ≤X≤ 104 %</p> <p><b>Purge System Low Purge Flow Enable</b> ≤X≤ <b>Purge System High Purge Flow Enable</b> in Supporting Tables.</p> <p><b>Purge System Low Purge Flow Remain Enabled</b> ≤X≤ <b>Purge System High Purge Flow Remain Enabled</b> in Supporting Tables.</p> <p>0.0 ≤X≤ 1.5 g/s -0.1 ≤X≤ 1.6 g/s</p>		



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable Induction vacuum to remain enabled  Vehicle Speed to enable Vehicle Speed to remain enabled  IAT to enable IAT to remain enabled  Purge DC change per 100 ms loop to enable Purge DC change per 100 ms loop to remain enable  *****  No active DTCs	$\leq 0.3$ kPa  $\leq 0.5$ kPa  $\geq 3.1$ mph  $\geq 1.9$ mph  $0.0 < X < 100.00$ deg C $-5.0 \leq X \leq 105.00$ deg C  $X < 5.0$ % $X < 6.0$ %  *****  P1467 - EVAP Purge Pump On Speed Performance  P1469 - Purge Pump Speed OOR Low  P146A - Purge Pump Speed OOR High  P146D - Purge Pump Pressure Sensor OOR Low  P146E - Purge Pump Pressure Sensor OOR High  P146F - Purge Pump Pressure Sensor Performance  P148E - Purge Pump		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending DTC's	Voltage OOR Low  P148F - Purge Pump Voltage OOR High  P1490 - Purge Pump Voltage Performance  P14A4 - EVAP Purge Pump Temperature Too High  LIN Communication Fault Active AmbientAirDefault ConvVenting_FA ConvPurgeCkt_FA VehicleSpeedSensor_FA OAT_EstAmbTemp_FA IAT_SensorFA  P14A4 - EVAP Purge Pump Temperature Too High  LIN Communication Fault Pending IAT_SensorFA		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump System Misassemble d	P146C	Purge pump pressure is too low for a given pump speed with the purge valve commanded closed. Detects a disconnected hose between the purge pump and purge valve.	Average Purge Pump Pressure Reading – Initial Purge Pump Pressure Reading  Readings are averaged for 5 seconds.	< <b>Purge Pump Misassembled Failure Threshold</b> * (times) <b>Purge Pump Diagnostic IAT Multiplier Factor</b> both in Supporting Tables  Calibration threshold (kPa) as a func of (Average Purge Pump Speed and barometric pressure) * IAT multiplier factor (unitless) as a func of IAT	Diagnostic is Enabled  Purge duty cycle is commanded to zero  Purge pump commanded on  Engine running  LIN data available for  LIN IAT data available  Powertrain relay voltage  Barometric pressure  Purge pump initial speed  Outside Air Temperature  Initial average purge pump pressure calculated and in range  Outside air temperature  No device control  Pump spool up time delay  Allow test time  Purge pump over temperature status  Initial pump speed capture period	    ≥ 2 counts  ≥ 11.0 volts ≥ 70 kPa ≤ 240 RPM -20 °C ≤X≤ 50 °C  -3 kPa ≤X≤ 13 kPa  ≥ 0 °C (only if pressure sensor is not in the range of -3 kPa ≤X≤ 13 kPa)  ≥ 7 seconds ≤ 36 seconds  = FALSE  ≥ 4 counts	Once per trip	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Purge pump speed  No active DTCs	≥ 35,000 RPM  P1467 - EVAP Purge Pump On Speed Performance  P1469 - Purge Pump Speed OOR Low  P146A - Purge Pump Speed OOR High  P146D - Purge Pump Pressure Sensor OOR Low  P146E - Purge Pump Pressure Sensor OOR High  P146F - Purge Pump Pressure Sensor Performance  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  P1490 - Purge Pump Voltage Performance  P14A4 - EVAP Purge Pump Temperature Too High  LIN Communication Fault Active AmbientAirDefault OAT_AmbientSensorFA ConvPurgeCkt_FA		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending DTC's	IAT_SensorFA ECT_Sensor_FA  P1469 - Purge Pump Speed OOR Low  P146A - Purge Pump Speed OOR High  P146D - Purge Pump Pressure Sensor OOR Low  P146E - Purge Pump Pressure Sensor OOR High  LIN Communication Fault Pending IAT_SensorFA		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Pressure Sensor Circuit Low Voltage	P146D	<p>This DTC will detect a Purge Pump Pressure sensor signal that is too low out of range.</p> <p>The Purge Pump Pressure sensor circuit out of range diagnostic compares the raw sensor % of 5 V ref to a lower threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.</p> <p>If the sensor % of 5 V ref is below the lower threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P146D DTC. A pass is reported for P146D DTC if the low sample counter reaches its threshold.</p>	<p>Purge pump pressure sensor signal</p> <p>The normal operating range of the purge pump pressure sensor is 0.5 volts (~ -6000 Pa) to 4.5 volts (~ 26000 Pa).</p>	< 4.1 % of 5 Vref ( 0.2 V or -8,361 Pa)	Diagnostic is 1.00		<p>1,280 failures out of 1,600 samples</p> <p>6.25 ms / sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Pressure Sensor Circuit High Voltage	P146E	<p>This DTC will detect a Purge Pump Pressure sensor signal that is too high out of range.</p> <p>The Purge Pump Pressure sensor circuit out of range diagnostic compares the raw sensor % of 5 V ref to a upper threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.</p> <p>If the sensor % of 5 V ref is above the upper threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P146E DTC. A pass is reported for P146E DTC if the high sample counter reaches its threshold.</p>	<p>Purge pump pressure sensor signal</p> <p>The normal operating range of the purge pump pressure sensor is 0.5 volts (~ -6000 Pa) to 4.5 volts (~ 26000 Pa).</p>	> 95.9 % of 5 Vref ( 4.8 V or 28,361 Pa	Diagnostic is 1.00		<p>1,280 failures out of 1,600 samples</p> <p>6.25 ms / sample</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Pressure Sensor Performance	P146F	<p>Purge pump pressure sensor offset pressure is out of range when sensor re-zero occurs.</p> <p>The DTC will be set if the purge pump pressure sensor offset is out of range when it tries to re-zero at the beginning of a cold start drive cycle.</p> <p>The re-zero test determines if the purge pump pressure sensor signal falls within a calibratable window about atmospheric pressure.</p> <p>The results of the re-zero test are used to determine if there is a re-zero problem.</p> <p>1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0.</p> <p>2) A 0.0 means that the re-zero pressure signal achieved exactly the previous learned offset.</p> <p>3) A ratio of 1.0 means that the re-zero pressure did not get within the window.</p> <p>4) Re-zero pressure within the window generates values between 0.0 and 1.0.</p>	<p>The purge pump pressure sensor signal is compared to a window about barometric pressure (sensor voltage offset (~1.25 volts))</p> <p>Upper pressure threshold (pressure addition above the nominal barometric pressure)</p> <p>The learned delta above the previous learned offset needs to be</p> <p>Lower pressure threshold (pressure subtraction below the nominal barometric pressure)</p> <p>The learned delta below the previous learned offset needs to be</p> <p>The difference between purge pump pressure sensor signal and the previous learned offset 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).</p> <p>When EWMA is the DTC light is</p>	<p>0.96 kPa rezero max</p> <p>&lt; 1.68 kPa delta max</p> <p>-0.96 kPa rezero min</p> <p>&gt; -1.68 kPa delta min</p> <p>&gt; 0.73 (EWMA Fail Threshold),</p>	<p>Diagnostic is Enabled</p> <p>Soak timer</p> <p>Power up coolant temperature</p> <p>Barometric pressure</p> <p>Engine not cranking</p> <p>Power up IAT</p> <p>Power up IAT</p> <p>LIN IAT data available</p> <p>Power Up Coolant temp – Power Up IAT temp</p> <p>Average purge pump pressure calculated</p> <p>No Active DTC's</p> <p>No Pending DTC's</p>	<p>≥ 3,600 seconds</p> <p>≤ 35 °C</p> <p>≥ 70 kPa</p> <p>≥ 4 °C</p> <p>≤ 35 °C</p> <p>≤ 8 °C</p> <p>P146D - Purge Pump Pressure Sensor OOR Low Fault Active</p> <p>P146E - Purge Pump Pressure Sensor OOR High Fault Active</p> <p>IAT_SensorFA ECT_Sensor_FA EngineModeNotRunTimer_FA AmbientAirDefault</p> <p>P146D - Purge Pump Pressure Sensor OOR Low Fault Active</p> <p>P146E - Purge Pump Pressure Sensor OOR High Fault Active</p>	100 ms	<p>Type A, 1 Trips</p> <p>EWMA Average run length: 6</p> <p>Run length is 2 trips after code clear</p>



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		The resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the purge pump pressure sensor signal re-zero test reports a failure. Once the purge pump pressure sensor signal re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the purge pump pressure sensor signal re-zero test again.	<p>illuminated.</p> <p>The EWMA calculation uses a 0.20 weighting coefficient.</p> <p>The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.</p>	≤ 0.40 (EWMA Re-Pass Threshold)				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Voltage Sensor Circuit Low	P148E	<p>This DTC will detect a purge pump voltage sensor signal that is out of range low (short to ground or open circuit).</p> <p>The purge pump voltage sensor signal out of range diagnostic compares the voltage sensor signal reading to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the voltage sensor signal reading 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 P148E DTC. A pass is reported for P148E DTC if the low sample counter reaches its threshold.</p>	Purge pump voltage sensor reading	< 3.5 volts	<p>Diagnostic is Enabled</p> <p>LIN data available for</p> <p>Powertrain relay voltage</p> <p>No active DTCs</p> <p>Np pending DTC's</p>	<p>≥ 2 counts</p> <p>≥ 11.0 volts</p> <p>LIN Communication Fault Active</p> <p>LIN Communication Fault Pending</p>	<p>50 failures out of 63 samples</p> <p>100 ms / sample</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Voltage Sensor Circuit High	P148F	<p>This DTC will detect a purge pump voltage sensor signal that is out of range high (short to power).</p> <p>The purge pump voltage sensor signal out of range diagnostic compares the voltage sensor signal reading to a upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.</p> <p>If the voltage sensor signal reading is above the upper voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P148F DTC. A pass is reported for P148F DTC if the low sample counter reaches its threshold.</p>	Purge pump voltage sensor reading	> 28.0 volts	<p>Diagnostic is Enabled</p> <p>LIN data available for</p> <p>Powertrain relay voltage</p> <p>No active DTCs</p> <p>Np pending DTC's</p>	<p>≥ 2 counts</p> <p>≥ 11.0 volts</p> <p>LIN Communication Fault Active</p> <p>LIN Communication Fault Pending</p>	<p>50 failures out of 63 samples</p> <p>100 ms / sample</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Voltage Sensor Performance	P1490	This diagnostic fails when the difference between purge pump voltage sensor reading and powertrain relay voltage reading is too large.	Absolute value of (Purge pump voltage sensor - powertrain relay voltage)	> 2.0 volts	Diagnostic is Enabled  Propulsion system on  Powertrain relay voltage  Engine not cranking  Voltage stabilization delay time after engine crank (> 2 seconds)  LIN data available for  No Active DTC's          No Pending DTC's	≥ 11.0 volts    ≥ 2.0 seconds  ≥ 2 counts  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  LIN Communication Fault Active  P148E - Purge Pump Voltage OOR Low  P148F - Purge Pump Voltage OOR High  LIN Communication Fault Pending	80 failures out of 100 samples  100 ms / sample	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 2 Not Plausible	P149A	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCIntSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>- BiasChk_EGR_DwnStmS</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_TS2_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_FA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b> CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflidAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:</p> <p><b>Engine Block:</b> CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:</p> <p><b>Engine Inlet:</b> CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutCIntSnsr</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Block:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Head Coolant:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Radiator Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p>	<p>EGRTempSensorDNSS_F A</p> <p>LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Comparison sensor 2: CeEECR_e_BiasChkMa nflAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:	25.00 °C  17.00 °C	=====  Comparison sensor 1 & 2 are not  ===== Aux Heat Detection  Aux heat detection can only be enabled the following are met:  No Active DTCs	= CeEECR_e_BiasChkNoS election     Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA  CeAEHR_e_BlkhtrBlock ClntSnsr CeAEHR_e_BlkhtrRadO utClntSnsr  > 10.00 °C  > 0 seconds > 28,800 seconds > -9.00 °C		
			<b>Head Coolant:</b> CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlo ckClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:	20.00 °C 10.00 °C	At power-up a warm sensor and cool sensor are compared Warm sensor  Cool sensor  If the warm sensor is compared to the cool sensor  Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature			
			<b>Heater Inlet:</b> CeEECR_e_PhysSnsr4 Comparison sensor 1: CeEECR_e_BiasChkByp InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater:		There are 4 different types of aux heater detection for this application:  2x2 signature	Enabled		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met.</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p> <p>30.00 °C 17.00 °C</p>	<p>Absolute Drop IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b> The warm sensors Sensor 1:  Sensor 2:  The cool sensors Sensor 1:  Sensor 2:  A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b> The is monitored for a drop.  The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for  A block heater is detected</p>	<p>Enabled Disabled Disabled</p> <p>CeAEHR_e_BlkhtrCylHdCntSnsr CeAEHR_e_BlkhtrEngInCntSnsr</p> <p>CeAEHR_e_BlkhtrRadOutCntSnsr CeAEHR_e_BlkhtrOutsideAirSnsr</p> <p>10.0 °C 10.0 °C &gt; 10.0 °C</p> <p>CeAEHR_e_BlkhtrBlockCntSnsr</p> <p>&gt; 9.00 L/min 0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p>		



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b> Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock CIntSnsr</p> <p>&gt; -1.00 L/min</p> <p>5.0 - 15.0 seconds</p> <p>&lt; 75.0 seconds</p> <p>&gt; 300.0 seconds</p>		

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Derivative count will increment if derivative is  If counts are a block heater is detected =====	< -0.10 °C/sec  ≥ 4 counts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 3 Not Plausible	P149B	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr3</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCIntSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>- BiasChk_EGR_DwnStmS</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_TS3_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_FA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b> CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflidAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:</p> <p><b>Engine Block:</b> CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:</p> <p><b>Engine Inlet:</b> CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutCIntSnsr</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Block:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Head Coolant:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Radiator Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p>	<p>EGRTempSensorDNSS_F A</p> <p>LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

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## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met.</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p> <p>30.00 °C 17.00 °C</p>	<p>Absolute Drop IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b></p> <p>The warm sensors Sensor 1:  Sensor 2:</p> <p>The cool sensors Sensor 1:  Sensor 2:</p> <p>A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b> The is monitored for a drop.</p> <p>The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>Enabled Disabled Disabled</p> <p>CeAEHR_e_BlkhtrCylHdCntSnsr CeAEHR_e_BlkhtrEngInCntSnsr</p> <p>CeAEHR_e_BlkhtrRadOutCntSnsr CeAEHR_e_BlkhtrOutsideAirSnsr</p> <p>10.0 °C 10.0 °C &gt; 10.0 °C</p> <p>CeAEHR_e_BlkhtrBlockCntSnsr</p> <p>&gt; 9.00 L/min 0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>A block heater is detected if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b> Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR</p>	<p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock ClntSnsr</p> <p>&gt; -1.00 L/min</p> <p>5.0 - 15.0 seconds</p> <p>&lt; 75.0 seconds</p>		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Insufficient coolant flow is present for  Derivative count will increment if derivative is  If counts are a block heater is detected =====	> 300.0 seconds  < -0.10 °C/sec  ≥ 4 counts		



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 4 Not Plausible	P149C	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr4</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the</p>		<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCIntSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>- BiasChk_EGR_DwnStmS</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_TS4_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_FA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b> CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:</p> <p><b>Engine Block:</b> CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:</p> <p><b>Engine Inlet:</b> CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutCIntSnsr</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Block:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Head Coolant:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Radiator Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p>	<p>EGRTempSensorDNSS_F A</p> <p>LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

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## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_AuxHeaterBiasHigh</p> <p>Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met.</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p> <p>30.00 °C 17.00 °C</p>	<p>Absolute Drop IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b> The warm sensors Sensor 1:  Sensor 2:  The cool sensors Sensor 1:  Sensor 2:  A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b> The is monitored for a drop.  The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>Enabled Disabled Disabled</p> <p>CeAEHR_e_BlkhtrCylHdCntSnsr CeAEHR_e_BlkhtrEngInCntSnsr</p> <p>CeAEHR_e_BlkhtrRadOutCntSnsr CeAEHR_e_BlkhtrOutsideAirSnsr</p> <p>10.0 °C 10.0 °C &gt; 10.0 °C</p> <p>CeAEHR_e_BlkhtrBlockCntSnsr</p> <p>&gt; 9.00 L/min 0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>A block heater is detected if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b> Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is</p>	<p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock CIntSnsr</p> <p>&gt; -1.00 L/min</p> <p>5.0 - 15.0 seconds</p> <p>&lt; 75.0 seconds</p>		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					present for  Derivative count will increment if derivative is  If counts are a block heater is detected =====	> 300.0 seconds  < -0.10 °C/sec  ≥ 4 counts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 5 Not Plausible	P149D	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the</p>		<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCIntSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>- BiasChk_EGR_DwnStmS</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_TS5_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_FA</p>	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b> CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflidAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:</p> <p><b>Engine Block:</b> CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:</p> <p><b>Engine Inlet:</b> CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutCIntSnsr</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Block:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Head Coolant:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Radiator Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature =====</p>	<p>EGRTempSensorDNSS_F A</p> <p>LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:	25.00 °C 17.00 °C	Comparison sensor 1 & 2 are not  ===== Aux Heat Detection  Aux heat detection can only be enabled the following are met:  No Active DTCs	= CeEECR_e_BiasChkNoS election      Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA  CeAEHR_e_BlkhtrBlock ClntSnsr CeAEHR_e_BlkhtrRadO utClntSnsr		
			Head Coolant: CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlo ckClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:	20.00 °C 10.00 °C	At power-up a warm sensor and cool sensor are compared Warm sensor  Cool sensor  If the warm sensor is compared to the cool sensor	> 10.00 °C		
			Heater Inlet: CeEECR_e_PhysSnsr4 Comparison sensor 1: CeEECR_e_BiasChkByp InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater:		Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature  There are 4 different types of aux heater detection for this application:  2x2 signature Absolute Drop	> 0 seconds > 28,800 seconds > -9.00 °C		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met.</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p> <p>30.00 °C 17.00 °C</p>	<p>IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b> The warm sensors Sensor 1:  Sensor 2:  The cool sensors Sensor 1:  Sensor 2:  A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b> The is monitored for a drop.  The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for  A block heater is detected</p>	<p>Disabled Disabled</p> <p>CeAEHR_e_BlkhtrCylHdCntSnsr CeAEHR_e_BlkhtrEngInCntSnsr</p> <p>CeAEHR_e_BlkhtrRadOutCntSnsr CeAEHR_e_BlkhtrOutsideAirSnsr</p> <p>10.0 °C 10.0 °C &gt; 10.0 °C</p> <p>CeAEHR_e_BlkhtrBlockCntSnsr</p> <p>&gt; 9.00 L/min 0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b> Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock ClntSnsr</p> <p>&gt; -1.00 L/min</p> <p>5.0 - 15.0 seconds</p> <p>&lt; 75.0 seconds</p> <p>&gt; 300.0 seconds</p>		

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Derivative count will increment if derivative is  If counts are a block heater is detected =====	< -0.10 °C/sec  ≥ 4 counts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 6 Not Plausible	P149E	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4</p> <p>Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> <li>- BiasChkCylHdCIntSnsr</li> <li>- BiasChkBlockCIntSnsr</li> <li>- BiasChkEngInCIntSnsr</li> <li>- BiasChkEngOutCIntSnsr</li> <li>- BiasChkHtrCrInCIntSnsr</li> <li>- BiasChkHtrCrOutCIntSnsr</li> <li>- BiasChkRadOutCIntSnsr</li> <li>- BiasChkByplnCIntSnsr</li> <li>- BiasChkEngMetalSnsr</li> <li>- BiasChkIntakeAirSnsr</li> <li>- BiasChkHumTmpSnsr</li> <li>- BiasChkManfldAirSnsr</li> <li>- BiasChkOutsideAirSnsr</li> <li>- BiasChkEngOilSnsr</li> <li>- BiasChk_EGR_UpStrmSnsr</li> <li>- BiasChk_EGR_DwnStmS</li> </ul>	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_TS6_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p> <p>EGRTempSensorUPSS_FA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>physical (Temperature) sensor number.</p> <p><b>Bypass Inlet:</b> CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nflidAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:</p> <p><b>Engine Block:</b> CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:</p> <p><b>Engine Inlet:</b> CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutCIntSnsr</p>	<p>20.00 °C</p> <p>10.00 °C</p> <p>30.00 °C</p> <p>10.00 °C</p>	<p>nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr</p> <p>Comparison sensors</p> <p>=====</p> <p>The following thresholds are based on the sensor under diagnosis</p> <p><b>Bypass Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Block:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Engine Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Head Coolant:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Inlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Heater Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p> <p><b>Radiator Outlet:</b> Propulsion Off Soak Time Ambient Air Temperature</p>	<p>EGRTempSensorDNSS_F A LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl</p> <p>= Available</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p> <p>≥ 28,800 seconds ≥ -9.0 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:  <b>Head Coolant:</b> CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlo ckClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B:  <b>Heater Inlet:</b> CeEECR_e_PhysSnsr4 Comparison sensor 1: CeEECR_e_BiasChkByp InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfdAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater:	25.00 °C 17.00 °C    20.00 °C 10.00 °C	===== Comparison sensor 1 & 2 are not  ===== Aux Heat Detection  Aux heat detection can only be enabled the following are met:  No Active DTCs   At power-up a warm sensor and cool sensor are compared Warm sensor  Cool sensor  If the warm sensor is compared to the cool sensor  Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature  There are 4 different types of aux heater detection for this application:  2x2 signature	= CeEECR_e_BiasChkNoS election  Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA  CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr  > 10.00 °C  > 0 seconds > 28,800 seconds > -9.00 °C  Enabled		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:</p> <p><b>Heater Outlet:</b> CeEECR_e_PhysSnsr5 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:</p> <p><b>Radiator Outlet:</b> CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B:</p> <p>A failure will be reported if any of the following conditions are met.</p>	<p>15.00 °C 10.00 °C</p> <p>25.00 °C 17.00 °C</p> <p>30.00 °C 17.00 °C</p>	<p>Absolute Drop IAT Drop Temperature Derivative</p> <p><b>2x2 Signature Criteria:</b> The warm sensors Sensor 1:  Sensor 2:  The cool sensors Sensor 1:  Sensor 2:  A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold)</p> <p><b>Absolute Drop Criteria:</b> The is monitored for a drop.  The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>Enabled Disabled Disabled</p> <p>CeAEHR_e_BlkhtrCylHdCntSnsr CeAEHR_e_BlkhtrEngInCntSnsr</p> <p>CeAEHR_e_BlkhtrRadOutCntSnsr CeAEHR_e_BlkhtrOutsideAirSnsr</p> <p>10.0 °C 10.0 °C &gt; 10.0 °C</p> <p>CeAEHR_e_BlkhtrBlockCntSnsr</p> <p>&gt; 9.00 L/min 0.0 - 60.0 seconds &lt; 120.0 seconds &gt; 300.0 seconds</p>		



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Evaluated in order:</p> <p>1) This sensor is above both comparison sensors</p> <p>2) This sensor is below both comparison sensors</p> <p>3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew</p> <p>4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew</p>	<p>&gt;A °C</p> <p>&gt;A °C</p> <p>&gt;B °C</p> <p>&gt;B °C</p>	<p>A block heater is detected if a drop is</p> <p><b>IAT Drop Criteria:</b> The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p><b>Temperature Derivative Criteria:</b> Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficient coolant flow is present for</p>	<p>&gt; 5.0 °C</p> <p>CeAEHR_e_BlkHtrIntake AirSnsr</p> <p>≥ 5.0 °C</p> <p>≥ 400.0 seconds</p> <p>≥ 24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>&gt; 180.0 seconds</p> <p>&gt; 1,800 seconds</p> <p>CeAEHR_e_BlkHtrBlock ClntSnsr</p> <p>&gt; -1.00 L/min</p> <p>5.0 - 15.0 seconds</p> <p>&lt; 75.0 seconds</p> <p>&gt; 300.0 seconds</p>		

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Derivative count will increment if derivative is  If counts are a block heater is detected =====	< -0.10 °C/sec  ≥ 4 counts		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP Purge Pump Temperature Too High	P14A4	Purge pump indicates it is too hot to operate and is in a protection mode (shuts down and/or will not turn on). Diagnostic rationalizes the purge pump too hot status against environmental and vehicle operating conditions.	Purge pump over temperature status AND Intake Air Temperature AND OBD Max Coolant Achieved (read description for details)	= True  < 45.0 °C  = FALSE	Diagnostic is Enabled  Propulsion system on  LIN data available for  LIN IAT data available  Engine running time  Powertrain relay voltage  No Active DTC's    No Pending DTC's	   ≥ 2 counts   ≥ 30 seconds  ≥ 11.0 volts  IAT_SensorFA ECT_Sensor_FA LIN Communication Fault Active  LIN Communication Fault Pending	80 failures out of 100 samples  100 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor A Signal Message Counter Incorrect	P14B6	This DTC monitors for an error in communication with the Mass Air Flow Sensor A.	<p>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:</p> <p>Temperature and Humidity ARC</p> <p>Pressure ARC</p>	<p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Tank Zone 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  Message frame from the Fuel Tank Zone Module containing the diagnostic status is received  All the following conditions are met for:  Battery Voltage  Sensor bus relay is on (if present)	1.00 (1 indicates enabled)  ≥ 3,000.00 milliseconds  ≥ 11.00 Volts	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Configuratio n Status Signal Message Counter Incorrect	P14CE	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Status Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 16 ARC</p> <p>Fuel Tank Zone Module Info 16 CSUM</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request Signal.	<p>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:</p> <p>Transmission 199 ARC</p> <p>Transmission ARC</p> <p>Transmission Engine Speed Request PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

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



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module "A"	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A.	<p>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:</p> <p>Aeroshutter Control Module 1 Initialization ARC</p>	<p>&gt;= 8.00 counts out of</p> <p>&gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	<p>Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal</p> <p>"Emissions Neutral Default Action : When the ECM determines that a serial communication fault has occurred with the EOCM or the ACC module in data frame \$2CB, the code is set and the Adaptive Control Cruise 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 ACC feature.</p>	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		<p>Diagnostic is enabled.</p> <p>Adaptive Cruise Control Command Serial Data Error Diagnostic Enable</p>	0.00	9 / 17 counts	<p>Type C, No SVS</p> <p>'Emissions Neutral Diagnostics – special type C"</p>

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undertermin ed	P155A	<p>Detects when cruise switch state cannot be determined, such as low voltage conditions</p> <p>"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."</p>	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 3.0 seconds	Diagnostic is enabled.		fail continuously for greater than 3.0 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	<p>Detects a failure of the cruise set 2 switch in a continuously applied state</p> <p>"Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit 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 applications with the secondary cruise switch circuit.</p>	Cruise Control Set 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	<p>Detects a failure of the cruise resume 2 switch in a continuously applied state</p> <p>"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." Only applicable for applications with the secondary cruise switch circuit.</p>	Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 89.000 seconds	<p>MIL: Type C, No SVS</p> <p>'Emissions Neutral Diagnostics – special type C"</p>

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Signal Message Counter Incorrect	P155E	This DTC monitors for an error in communication with the DC/DC Converter Actuator Voltage Signal.	<p>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:</p> <p>DC Converter Actuator Voltage ADC ARC</p> <p>DC Converter Actuator Voltage ADC PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5s loop.	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Signal Message Counter Incorrect	P156D	This DTC monitors for an error in communication with the DC/DC Converter Ignition Switch Run/Start Position Signal.	<p>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:</p> <p>DC Converter Run Crank Terminal Status ARC</p> <p>DC Converter Run Crank Terminal Status PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Signal Message Counter Incorrect	P156E	This DTC monitors for an error in communication with the DC/DC Converter Crank Control Terminal Signal.	<p>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:</p> <p>DC Converter Crank Control Terminal Status ARC</p> <p>DC Converter Crank Control Terminal Status PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Calibration Incorrect	P158A	Type of cruise in Body Control Module does not match that in the Engine Control Module for 2.5 seconds  "Emissions Neutral Default Action : This diagnostic compares the BCM and the ECM configuration calibrations of whether No Cruise, Conventional Cruise Control, or ACC is available on the vehicle. If the calibration for the cruise system type in the ECM does not match the value in \$4E9 signal Vehicle Speed Control System Type, a P158A DTC is set and cruise control is disabled."	Type of cruise system in GMLAN \$4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	Diagnostic is enabled.  DID \$40 from BCM says cruise system is present (ECM receives programmable information from Body Control Module)  OR  ECM will not receive Programmable information for Cruise from Body Control Module	True	fail continuously for greater than 2.5 seconds.	Type C, No SVS "Emissions Neutral Diagnostics – Special Type C"

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit Low	P159F	This DTC will detect an analog driver mode switch input that is too low out of range.	<p>For button type Normal_Button</p> <p>Analog Mode Switch low voltage threshold % of 5V range</p> <p>For button type Enhanced_Button</p> <p>Analog Mode Switch low voltage threshold % of 5V range</p> <p>For button type Multiple_Button</p> <p>Analog Mode Switch low voltage threshold % of 5V range</p>	<p>&lt; 29.00 %</p> <p>&lt; 24.30 %</p> <p>&lt; 21.20 %</p>	Vehicle mode analog switch button type	= CeDMDG_e_Normal_Button	<p>200 failures out of 250 samples</p> <p>25 ms / sample</p>	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit High	P15A0	This DTC will detect an analog driver mode switch input that is too high out of range.	<p>For button type Normal_Button</p> <p>Analog Mode Switch high voltage threshold % of 5V range</p> <p>For button type Enhanced_Button</p> <p>Analog Mode Switch high voltage threshold % of 5V range</p> <p>For button type Multiple_Button</p> <p>Analog Mode Switch high voltage threshold % of 5V range</p>	<p>&gt;= 88.80 %</p> <p>&gt;= 94.10 %</p> <p>&gt;= 95.30 %</p>	Vehicle mode analog switch button type	= CeDMDG_e_Normal_Button	<p>200 failures out of 250 samples</p> <p>25 ms / sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Performance	P15A1	This DTC will detect an analog driver mode switch input that is in an indeterminate range.	<p>For button type Normal_Button</p> <p>Analog Mode Switch indeterminate region % of 5V range</p> <p>For button type Enhanced_Button</p> <p>Analog Mode Switch indeterminate regions % of 5V range</p> <p>For button type Multiple_Button</p> <p>Analog Mode Switch indeterminate regions % of 5V range</p>	<p>66.80 % ≤ % of 5 volts &lt; 72.80 %</p> <p>63.50 % ≤ % of 5 volts &lt; 65.50 %</p> <p>83.50 % ≤ % of 5 volts &lt; 85.50 %</p> <p>52.90 % ≤ % of 5 volts &lt; 54.10 %</p> <p>74.10 % ≤ % of 5 volts &lt; 75.30 %</p> <p>87.50 % ≤ % of 5 volts &lt; 88.60 %</p>	Vehicle mode analog switch button type	= CeDMDG_e_Normal_Button	<p>200 failures out of 250 samples</p> <p>25 ms / sample</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Object Detection Control Module Torque Request Signal Message Counter Incorrect	P15F6	<p>Detects rolling count or protection value errors in Collision Preparation System Axle Torque Command serial data signal</p> <p>"Emissions Neutral Default Action : When the ECM determines that a serial communication fault has occurred with the EOCM in frame \$2CD, the code is set and the Collision Preparation System is disabled."</p> <p>Only applicable for applications with Full Speed Range Adaptive Cruise Control and Collision Preparation System feature.</p>	If x of y rolling count / protection value faults occur, disable collision preparation system for duration of fault		<p>Diagnostic is enabled.</p> <p>Front Object Detection Module Torque Request Serial Data Error Diagnostic Enable</p>	0.00	4 / 10 counts	<p>Type C, No SVS</p> <p>'Emissions Neutral Diagnostics – special type C"</p>

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Automatic Braking Engine Torque Request Signal Message Incorrect	P15F8	<p>Detects rolling count or protection value errors Rear Virtual Bumper Axle Torque Command serial data signal</p> <p>"Emissions Neutral Default Action : When the ECM determines that a serial communication fault has occurred with the EOCM in frame \$2F9, the code is set and the auto braking feature is disabled for the remainder of the key cycle." Only applicable for applications with Full Speed Range Adaptive Cruise Control and Collision Preparation System feature.</p>	If x of y rolling count / protection value faults occur, disable rear virtual bumper or collision preparation system for duration of fault		<p>Diagnostic is enabled.</p> <p>Automatic Braking Engine Torque Request Serial Data Error Diagnostic Enable</p>	0.00	4 / 10 counts	<p>Type C, No SVS</p> <p>'Emissio ns Neutral Diagnost ics – special type C"</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal.	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
			IBS MVI ARC	>= 8.00 counts out of >= 10.00 counts	All the following conditions are met for:	>= 3,000.00 milliseconds		
			IBS Calculated Data ARC	>= 8.00 counts out of >= 10.00 counts	Battery voltage	>= 11.00 volts		
			IBS Measured Temperature ARC	>= 8.00 counts out of >= 10.00 counts	Accessory mode to off mode transition not pending			
			NAHr Charge ARC	>= 8.00 counts out of >= 10.00 counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			NAHr Discharge ARC	>= 8.00 counts out of >= 10.00 counts	Controller type: OBD Controller			
			Current FOM ARC	>= 8.00 counts out of >= 10.00 counts				
			Voltage FOM ARC	>= 8.00 counts out of >= 10.00 counts				
			IBS FOM ARC	>= 8.00 counts out of >= 10.00 counts				
			Vehicle Startup ARC	>= 8.00 counts				

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Battery Rational ARC	out of >= 10.00 counts  >= 8.00 counts out of >= 10.00 counts				



## 21OBDG03D ECM Summary Tables

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210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Reference Voltage Status Message Counter Incorrect	P165C	This DTC monitors for an error in communication with the Sensor Reference Voltage Status Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 1 ARC</p> <p>Fuel Tank Zone Module Info 1 CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 2 ARC</p> <p>Fuel Tank Zone Module Info 2 CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  AND  (Run/Crank voltage > Table, f(IAT). See supporting tables: <b>P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)</b>  OR PT Relay Ignition voltage > 5.50 Volts)  AND  Run/Crank voltage > 5.50 Volts	240 / 480 counts; or  0.175 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 commanded on  AND  (Run/Crank voltage > Table, f(IAT). See supporting tables: <b>P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)</b>  OR PT Relay Ignition voltage > 5.50 Volts)  AND  Run/Crank voltage > 5.50 Volts	240 / 480 counts; or  0.175 sec continuous;  12.5 ms/count in main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage - (GEN III 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  Powertrain relay state	= 1.00  = INACTIVE	50 failures out of 63 samples  100 ms / sample	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit Low Voltage	P16D4	This DTC monitors for a battery module low voltage circuit fault.	Battery Module signals a low voltage circuit fault via LIN bus  VeVITR_U_12VBattVolt	< 3.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit High Voltage	P16D5	This DTC monitors for a battery module high voltage circuit fault	Battery Module signals a high voltage circuit fault via LIN bus  VeVITR_U_12VBattVolt	> 26.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Low	P16D6	This DTC monitors for a battery module current low fault	Battery Module signals a current low fault via LIN bus  VeVITR_I_12VBattCurrRa w	< -1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit Open	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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	<p>Sensor Bus relay circuit open diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage ≥ 11.00 volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controlle rs P16D8 may also set (Sensor Bus Relay Control Circuit Low).</p>

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to ground: $\leq 0.5 \Omega$ impedance between output and controller ground	<p>Sensor Bus relay circuit short to ground diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage <math>\geq 11.00</math> volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controllers P16D7 may also set (Sensor Bus Relay Control Circuit Open).</p>

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	Short to power: $\leq 0.5 \Omega$ impedance between output and controller power	<p>Sensor Bus relay circuit short to power diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage <math>\geq 11.00</math> volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current High	P16DD	This DTC monitors for a battery module current high fault	Battery Module signals a current high fault via LIN bus  VeVITR_I_12VBattCurrRaw	> +1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Low	P16DE	This DTC monitors for a battery module internal temperature circuit low fault	Battery Module raw temperature 1 value	> 120.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24 or zero</p> <p>= zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit High	P16DF	This DTC monitors for a battery module internal temperature circuit high fault	Battery Module raw temperature 1 value	< -43.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus)</p> <p>For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24</p> <p>= zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	This DTC monitors for a battery module RAM memory fault	Battery Module signals a RAM memory fault via LIN bus  VeVITR_e_IBS_IntRAM_Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Read Only Memory (ROM) Error	P16E2	This DTC monitors for a battery module ROM memory fault	Battery Module signals a ROM memory fault via LIN bus  VeVITR_e_IBS_IntROM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled  Power Mode  12V System Reference Voltage  LIN Bus Off or Battery Module Communication Faults Active  Outside Air Temperature  Outside Air Temperature Validity Bit	Enabled  Not equal off  > 9.00 Volts  = False  > -20.00 Celsius and < 50.00 Celsius  = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Data Incompatible	P16E3	This DTC monitors for a battery module data incompatible fault	<p>Battery Module data received over LIN bus is incompatible. (Measured by any of the following)</p> <p>Historical Test</p> <p>Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 80.00 Ah)</p> <p>or</p> <p>IBS Returns a battery type that is not equal to</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.15 V)</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.66 V)</p> <p>Continuous Test</p>	<p>Upon IBS wakeup, if any of the below Historical Test conditions are satisfied, the diagnostic fails.</p> <p>&gt; 5.00 Ah</p> <p>CeBSER_e_IBS_Cfg BatAGM</p> <p>&gt; 0.50 Volts</p> <p>&gt; 0.50 Volts</p> <p>If any of the below conditions are satisfied for 16.00 fail counts</p>	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>IBS Configuration Data Available over LIN bus</p> <p>Historical Test Only Host Controller MEC Counter</p>	<p>Enabled</p> <p>Enabled</p> <p>Not equal off</p> <p>&gt; 9.00 Volts</p> <p>= False</p> <p>&gt; -20.00 Celsius and &lt; 50.00 Celsius</p> <p>= True</p> <p>= True</p> <p>&lt;= 0</p>	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 80.00 Ah)</p> <p>or</p> <p>IBS Returns a battery type that is not equal to</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.15 V)</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.66 V)</p>	<p>out of 20.00 sample counts, the diagnostic fails.</p> <p>&gt; 5.00 Ah</p> <p>CeBSER_e_IBS_Cfg BatAGM</p> <p>&gt; 0.50 Volts</p> <p>&gt; 0.50 Volts</p>				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance (Gasoline applications ONLY)	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures  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	-66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	93.73 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 425 ms continuous, 0.5 down time multiplier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold  0.00 Nm  Low Threshold  0.00	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 650 rpm	Up/down timer 443 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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 multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,074.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1,074.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000  Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 8,191.88 or 8,191.88 rpm (hysteresis pair)	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 40 counts; 25.0msec/count	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			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 multiplier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold:  1.10 T/C Range Hi  0.10 T/C Range Lo  Low Threshold:  1.10 T/C Range Hi  0.10 T/C Range Lo	Ignition State	Accessory, run or crank	5 / 15 counts; 25.0msec/count	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24  No fuel injector faults active	Up/down timer 443ms continuous, 0.5 down time multiplier	
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank  Transfer case range valid and not over-ridden  FWD Apps only	7.00 / 10.00 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475ms continuous, 0.5 down time	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multiplier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). <b>P16F3_Speed Control External Load f(Oil Temp, RPM)</b> + 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multiplier	
			Positive Torque Offset is greater than its redundant calculation plus threshold  OR  Positive Torque Offset is less than its redundant calculation minus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,  down time	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multiplier 0.5	
			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 2,048 ms continuous, 0.5 down time multiplier	
			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 multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			1. Cylinder Torque Offset exceeds step size threshold  OR	1. 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 66.00 Nm				
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 multiplier	



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 143 ms continuous, 0.5 down time multiplier	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>P16F3_Speed Control External Load f(Oil Temp, RPM)</b> + 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>P16F3_Speed Control External Load f(Oil Temp, RPM)</b> +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				66.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,074.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,074.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold	1,074.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR  Commanded Immediate Request is less than its redundant calculation minus threshold				multiplier	
			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 multiplier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	40.28 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Engine min capacity above threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 120 ms continuous, 0.5 down time multiplier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than 0rpm	Up/down timer 425 ms continuous, 0.5 down time multiplier	
			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 164 ms continuous, 0.5 down time multiplier	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			Speed Control's Predicted Torque Request 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 multiplier	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 385 ms continuous, 0.5 down time multiplier	
			Desired throttle position greater than redundant calculation plus threshold	8.48 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			Throttle desired torque above desired torque plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 66.00 Nm  Low Threshold - 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000429 Low Threshold - 0.0000429	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold	High Threshold 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	Low Threshold  - 66.00 Nm			down time multiplier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold  66.00 Nm  Low Threshold  0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold  39.00 Nm  Low Threshold  0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 66.00 Nm  Low Threshold - 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 66.00 Nm  Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Absolute difference	66.00	Ignition State	Accessory, run or crank	Up/down timer	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			between the Supercharger friction torque and its redundant calculation greater than threshold	Nm			475 ms continuous, 0.5 down time multiplier	
			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  66.00 Nm  Low Threshold  -66.00 Nm  Rate of change threshold  4.13 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Torque error compensation is out of bounds given by threshold range	High Threshold  66.00 Nm  Low Threshold  0.00	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 6.60 Nm  Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold  OR  2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exceed threshold  OR	1. 65.00 Nm 2. N/A  3. 65.00 Nm 4. 65.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 66.00 Nm  3. & 4.:	Up/down timer 475 ms continuous, 0.5 down time multiplier	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			3. Rate of change of reserve torque exceeds threshold, increasing direction only  OR  4. Reserve engine torque above allowable capacity threshold			Accessory, run or crank		
			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 multiplier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: <b>P16F3_Delta MAP Threshold f(Desired Engine Torque)</b>		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			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 multiplier	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Driver Predicted Request is greater than its redundant calculation plus threshold  OR  Driver Predicted Request is less than its redundant calculation minus threshold	1,074.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: <b>Speed Control</b> <b>External Load f(Oil</b>	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Temp, RPM) + 66.00 Nm			down time multiplier	
			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 multiplier	
			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 changing and one loop after React command  Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 475 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 143 ms continuous, 0.5 down time multiplier	
			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 425 ms continuous, 0.5 down time multiplier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	66.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multiplier	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	66.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			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) > 66.00 Nm	Up/down timer 443 ms continuous, 0.5 down time multiplier	
			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	66 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multiplier	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 > 650 rpm	Up/down timer 443 ms continuous, 0.5 down time multiplier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	40.28 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multiplier	
			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  OR	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal</p> <p>OR</p> <p>3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal</p>					
			Commanded axle torque is greater than its redundant calculation by threshold	1,074.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded axle torque is less than its redundant calculation by threshold	1,611.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank  AFM apps only	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			AC friction torque is greater than commanded by AC control software	39.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 143 ms continuous, 0.5 down time multiplier	
			Transmission Torque Request calculations 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 calculation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of maximum throttle area	15 mm2			Up/down timer 164	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and its redundant calculation is greater than a threshold				ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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 multiplier	
			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 multiplier	
			Difference between Estimated Engine Torque and Commanded Engine Torque is greater than an offset  -OR-  Difference between Engine Torque Control Feedback and its redundant feedback calculation are beyond its safety bounds  -OR-	66.00 Nm     Greater than 66.00 Nm or Lower than 66.00 Nm	Engine State	Running	Up/down timer 200.00 ms continuous, 0.5 down time multiplier	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Immediate Feedback Control is active beyond allowed  -OR-  Torque Control Solver Failure is active	2.00 seconds				
			Calculated or Commanded Engine to Axle ratio is lower than a threshold  -OR-  Engine to Axle Offset is greater than a threshold	0.9   66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 0.5 down time multiplier	
			Difference between Cruise Arbitration Request and its redundant calculation exceeds a threshold  -OR-  Difference between Cruise Acceleration Request and its redundant calculation exceeds a threshold	40.28 Nm   0.05 KPH/Second	Ignition State	Accessory, run or crank	Up/down timer 500.00  ms continuous, 0.5 down time multiplier	
			Difference between commanded Axle Torque and its redundant calculation is greater than a threshold  -OR-  Difference between commanded Axle Torque	1,074.00 Nm   1,611.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and its redundant calcultion is less than a threshold					



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Transmissio n 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     OR:  Transmission range control routine   Transmission range control routine   Transmission range control routine	is issued unexpectedly  OR  ≠ expected range   Does not issue Park or Neutral command quickly enough in response to driver request  Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1.  Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable  CodeClearFunction AND ManufacturingModeActive AND:  External: Run/Crank OR Accessory/Wakeup  Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup  cal value must be =6 to enable the type B DTC:	= True  =False =False  =True = True  =True =Park =False  6.00	200 , 200 , 200 , 2,050 , 200 or 200 msec, depending on conditions.  T1 = 200 msec  T2 = 200 msec	DTC Type B Two Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.  Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	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:  Acceleration Sensor Value ARC  Acceleration Sensor CSUM	  >= 15.00 counts out of >= 18.00 counts  >= 15.00 counts out of >= 18.00 counts	Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.  All the following conditions are met for:  Battery voltage  Accessory mode to off mode transition not pending  If controller is a non-OBD controller then battery voltage  Controller type: OBD Controller	  >= 3,000.00 milliseconds  >= 11.00 volts  <= 18.00 volts	Executes in 12.5ms loop.	Emission Neutral Diagnostic – Type C

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Mode Switch Signal Circuit  Include for programs that are NOT hybrid start stop conventional	P1762	BCM to ECM Rolling Count check for CAN frame \$1E1. -- Only utilize when calibration variable KeINFG_e_HybridType does not equal CeINFR_e_StartStopC onv. (Note: Not Equal To is represented by <>)	Rolling count value received from BCM does not match expected value	= TRUE	Engine Speed Engine Speed  Engine speed between min/max for  Vehicle Speed for  Hybrid type	≥ 200 RPM ≤ 7,500 RPM  ≥ 5.0 seconds  ≤ 318.14 MPH ≥ 5.0 seconds  <>CeINFR_e_StartStopC onv	> 3 error counts for > 10.0 seconds  100 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powerflow Engaged Signal Message Incorrect	P1772	This DTC monitors for an error in communication with the Powerflow Engaged Signal.	<p>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:</p> <p>If Non-Hybrid Application: Transmission Engaged Powerflow Information Alive Rolling Count 197 ARC</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 197 PV</p> <p>If Hybrid Application: Transmission Engaged Powerflow Information Alive Rolling Count 1AB ARC</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 1AB PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IMS State Signal Message Incorrect	P1773	This DTC monitors for an error in communication with the IMS State Signal.	<p>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:</p> <p>If Non-Hybrid Application: Transmission Actual Range Status 197 ARC</p> <p>Transmission Actual Range Status 197 PV</p> <p>If Hybrid Application: Transmission Actual Range Status 1AB ARC</p> <p>Transmission Actual Range Status 1AB PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Availability Signal Message Incorrect	P1778	This DTC monitors for an error in communication with the Transmission Range Availability Signal.	<p>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:</p> <p>Transmission Range Diagnostic Critical Fault ARC</p> <p>Transmission Range Diagnostic Critical Fault PV</p> <p>Transmission Range Diagnostic Limited Fault ARC</p> <p>Transmission Range Diagnostic Limited Fault PV</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range  The internal system only diagnoses range changes in and out of Park.	≠ Previous Value and ≠ Commanded Range	Actual Transmission Range  Range Change Achievement Diag  cal must be =6 to enable a type B DTC:	= Valid Range  = Not running  6.00	1,500 ms	DTC Type B, Two Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Current Transmission 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  AND CodeClearFunction AND ManufacturingModeActive AND:  External: Run/Crank OR Accessory/Wakeup  Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup  cal must be =6 to enable a type B DTC:	= Valid  = False = False  = True = True  = True = Park = False  6.00	80 failures out of 100 samples  12.5 ms loop	DTC Type B, Two Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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  1023 counts = 5 Volts	The enabling calibration must be set to 6 to enable a type B DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissio ns Neutral Diagnost ics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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  853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enabling calibration must be set to 6 to enable a type B DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissio ns Neutral Diagnost ics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)  53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active  The enabling calibration must be set to 6 to enable a type B DTC:	P17A4, P17A3  3.00	100 Failures out of 120 Samples =500 msec (5 msec loop)	Emissions Neutral Diagnostics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Enable Switch A/B Correlation	P17A6	Correlation diagnostic compares both switches	Measured Voltage Percent of Selector Enable Switch A and Switch B	Are both VALID, (Release or Pressed), but disagree.  Pressed: 49% - 61%  Released: 70% - 82%	Interlock comparison diagnostic enabling calibration =  The controller has been awake for at least:  The enabling calibration must be set to 6 to enable a type B DTC:	1.00  =0.05 seconds  3.00	12.5 ms rate  24,000.00 failures out of 24,000.00 samples	Emissio ns Neutral Diagnost ics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Enable Switch B Circuit Low	P17A7	Detects Selector Enable Switch B circuit reading low	Selector Enable Switch Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts.  1023 Counts = 5 V	The enabling calibration must be set to 6 to enable a type B DTC	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissio ns Neutral Diagnost ics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Enable Switch B Circuit High	P17A8	Detects Selector Enable Switch B circuit reading high	Selector Enable Switch Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts.  1023 Counts = 5 V	The enabling calibration must be set to 3 to enable a type C DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissio ns Neutral Diagnost ics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)  53.2% < X < 73.7% of 5 Volts.  1023 Counts = 5 V	Not Fault Active  The enabling calibration must be set to 6 to enable a type B DTC:	P17A8, P17A7  3.00	100 Failures out of 120 Samples =500 msec  (5 msec loop)	Emissions Neutral Diagnostics – Type C No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selection Signal Message Counter Incorrect	P17D7	ARC & PV reported SIB for \$1E8 signal from the ECM on Powertrain Sensor CAN BusDetects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1  Primary Value ≠ Protection Value	Ignition  The enabling calibration must be set to 6 to enable a type 6 DTC:	Run or Run/Crank  6.00	1 second	Type B two trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Memory Checksum Error	P17D8	[1] This DTC will be stored if any software or calibration checksum is incorrect.  [2] Circuit Monitor mismatch occurs	[1] Calculated Checksum          [2] Switch circuit calculated values:	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)         ≠ switch circuit monitor values	Ignition  OR  Accessory    The enabling calibration must be set to 5 to enable a type A DTC:	Run or Run/Crank   ON    5.00	[1] 1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures   Frequency: Runs continuously in the background   [2] Test runs during calculation of switch circuit values	Type A one trip

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the BIST (=Built in Self Test) for [1] the ROM checksum or [2] the ROM Error correcting code (ECC) check fails.	[1] Checksum at power-up  [2] ROM ECC	≠ checksum at power-down  = fault	Ignition  OR Accessory:  The enabling cal must be set to 5 to enable a type A DTC:	Run or Run/Crank  ON  5.00	[1] 1 failure Frequency: Once at power-up  [2] 1 failure Frequency: Runs continuously in the background	Type A 1 trip

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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:  OR  Accessory  The DTC enabling calibration must be set to 5 to enable a type A DTC:	Run or Run/Crank   ON   5.00	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures  This test runs continuously in the background	Type A one trip

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Processor	P17DB	Indicates the ECU has detected an internal processor fault. This DTC is dependent on the microprocessor and includes self testing not listed.  [1] Microprocessor ALU Integrity Diagnostic Monitor Algorithm [2] Main Processor Configuration Register Test [3] Seed and Key fault (Set by ECM when seeds and keys do not match) [4] Stack overflow [5] Program Counter Exception Error [6] Watchdog Fails to reset	[1] Calculated key from rolling seed  [2] Processor register  [3] <This test has no threshold value.>  [4] Unused stack memory above maximum stack used  [5] Illegal instruction loaded into program counter  [6] Set when a fault that should cause a reset fails to cause a reset.	[1] ≠ expected key  [2] ≠ expected processor register value  [3] No threshold value  [4] ≠ initialized special pattern  [5] No threshold value  [6] No threshold value	For all six cases:  Ignition  Accessory  The enabling calibration must be set to 5 to enable a type A DTC:	For all six cases:  Run or Run/Crank  OR  ON  5.00	[1] 1 failure Test runs continuously (20ms loop or less)  [2] 1 failure Test runs continuously (20ms loop or less)  [3] 1 failure Test runs continuously (25ms loop or less)  [4] 1 failure Test run by OS on task switches  [5] 1 failure  [6] 1 failure	Type A 1 trip

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Control Module Ignition On/ Start Switch Circuit Low	P17E0	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message  The enabling cal must be set to 6 to enable a type B DTC:	= 1 indicating RUN/ CRANK  6.00	4.5 sec in 5.5 second window	Type B two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Control Module Ignition On/ Start Switch Circuit High	P17E1	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Engine Controller Run Crank Terminal Status - CAN Message  Enabling cal must be =6 to enable type B DTC:	= 0, indicating NOT RUN/CRANK  6.00	8 sec in 10 second window	Type B two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Park Position Switch A/B Circuit Stuck On	P17F3	Checks if both Park switches are stuck closed	Both Park Switches are PRESSED	≥ 60.00 seconds	Not Fault Active  Controller is "on"  DTC Type (0 = disabled)	P07B3, P07B4, P07B4, P07B9, P07BA, P07BB  >~ 100 ms  = 6.00	1.00 failures out of 1.00 samples	DTC Type B Two trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Enable Switch A/B Circuit Stuck On	P17F4	Checks if enable switch is stuck pressed.	Enable Switch A or B are PRESSED	≥ 600.00 seconds	Enabled via calibration  Controller is  Cal must be equal to 3 to enable a type C DTC:	1.00  "On"  3.00	1.00 failures out of 1.00 samples	Emissio ns Neutral Diagnost ics – Type C No MIL



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Primary Signal Message Counter Incorrect	P187F	This DTC monitors for an error in communication with the Transmission Range Selector Switches Primary Signal.	<p>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:</p> <p>Shifter Interface Board Input Sensor State Primary ARC</p> <p>Shifter Interface Board Input Sensor State Primary CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Secondary Signal Message Counter Incorrect	P188A	This DTC monitors for an error in communication with the Transmission Range Selector Switches Secondary Signal.	<p>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:</p> <p>Shifter Interface Board Input Sensor State Secondary ARC</p> <p>Shifter Interface Board Input Sensor State Secondary CSUM</p>	<p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Signal Message Counter Incorrect	P188B	This DTC monitors for an error in communication with the Transmission Range Signal.	<p>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:</p> <p>Dual Track Pulse Width Crank Permission Status ARC</p> <p>Dual Track Pulse Width Crank Permission Status PV</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	When either is "PRESSED" for 100 ms then pressed event is entered.  Fault is incremented if other switch	Is not pressed during event.	Not Fault Active  Controller is on  Park button switch signals:  Vehicle Speed  Comprehensive correlation diagnostics:  Cal must be =6 to enable a type B DTC:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB  >~100 ms  =valid  <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .  =True  6.00	8.00 synchronized failures in a row.  *note: these samples can accumulate over key-cycles	DTC Type B, Two trips. MIL is set on the second occurrence of the fault.

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Primary Signal Message Counter Incorrect	P189E	This DTC monitors for an error in communication with the Transmission Range Selector Primary Signal.	<p>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:</p> <p>Shifter Interface Board Linear Sensor Status Primary ARC</p> <p>Shifter Interface Board Linear Sensor Status Primary CSUM</p>	<p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p> <p>&gt;= 8.00 counts out of &gt;= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Secondary Signal Message Counter Incorrect	P189F	This DTC monitors for an error in communication with the Transmission Range Selector Secondary Signal.	<p>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:</p> <p>Shifter Interface Board Linear Sensor Status Secondary ARC</p> <p>Shifter Interface Board Linear Sensor Status Secondary CSUM</p>	<p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 4.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 25ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Assistance System Performance	P18CB	Determines if Park assist active bit from EBCM is valid	Speed Error - APA active (\$1C6/\$1C7) above a vehicle speed threshold  OR Initialization Error - APA active (\$1C6/\$1C7) without an active torque request  OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	> 10.00   APA active boolean transitions from False to True with Torque Intervention = No request   APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00	Active Communication with EBCM  Power Mode Engine Running  Status of traction in GMLAN message (\$4E9)  Run/Crank Active  Ignition Voltage	Received serial data  = Run = True  = Traction Present  > 0.50 seconds  > 6.41 volts	>= 4 failures out of 10  Performed every 12.5ms   >= 4 failures out of 10  Performed every 12.5ms   When transition occurs, no number of samples  Performed every 12.5ms	Type C, No SVS Emissions Neutral Diagnostic - Type C

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance  (For use on vehicles with two fuel senders and mechanical transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range.	1) If Deadband diagnostic subtest Enabled AND 2a) If fuel volume in primary tank is and 2b) if fuel volume in secondary tank is and 2c) and if 2a and 2b indications do not change while fuel volume consumed by engine is	1) == Disabled status  2a) $\geq 1,024.0$ liters  2b) $< 2.7$ liters  2c) $\geq 18.0$ liters	1a) Diagnostic Enabled 1b) Engine Operational Status	1a) == True 1b) == Running	250 ms / sample	Type B, 2 Trips
			1) If Secondary sensor rationality diagnostic subtest enabled AND 2a) Volume in primary tank is 2b) and volume in secondary tank is 2c) and remains in this condition for	1) == Disabled status  2a) $< 1,024$ liters  2b) $> 3$ liters  2c) $\geq 1,800$ seconds	1a) Diagnostic Enabled  1b) Engine Operational Status Engine Running	1a) == True  1b) == Running	250 ms / sample	
			a) If indicated fuel volume change is b) while fuel consumed by the engine is	a) $\leq 3.00$ liters  b) $\geq 19$ liters	1a) Diagnostic Enabled  1b) Engine Operational Status Engine Running  2) Secondary tank volume [Not Empty] is	1a) == True  1b) == Running  2) $\geq 2.7$ liters	250 ms / sample	



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage  (For use on vehicles with two fuel senders)	P2067	This DTC will detect a fuel sender out-of- range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 22.13 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True  b) == True  c) == True  d) <> True	100 failures out of 125 samples  100 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit High Voltage  (For use on vehicles with two fuel senders)	P2068	This DTC will detect a fuel level sensor out-of- range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 0.66 liters	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True  b) == True  c) == True  d) <> True	100 failures out of 125 samples  100 ms / sample	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between signal and controller ground	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Low – Bank 1	P2090	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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between signal and controller ground	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit High – Bank 1	P2091	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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply voltage</p> <p>Output driver</p> <p>Ignition switch</p>	<p>&gt; 11.00 Volts</p> <p>On</p> <p>Crank or Run</p>	<p>20 failures out of 25 samples</p> <p>250 ms /sample, continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	<p>Determines if the post catalyst O2 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.</p> <p>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.</p> <p>Note: When the post catalyst O2 voltage is too lean, the post catalyst O2 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</p>	<p>The Average Integral Offset % Authority</p> <p>AND</p> <p>The Average Total Offset % Authority</p> <p>(Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria)</p> <p>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 &gt;= 18 % for &gt;= 1.0 seconds AND the % Authority metric is approaching the failure threshold.</p> <p>Diagnosis resumes if the purge valve is closed OR the percent vapor is &lt;= 14 % for &gt;= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p>&gt;= 98.0 %</p> <p>&gt;= 62.8 %</p> <p>If the P2096 is actively failing then the Average Integral Offset must be &lt; 98.0 % and the Average Total Offset must be &lt; 62.8 % for the diagnostic to report a pass.</p>	<p>The post cat fuel trim diagnostic is enabled</p> <p>The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration</p> <p>Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp.</p> <p>PTO Intrusive diag. fuel control Ethanol Estimation in Progress</p> <p>O2 Heater Learned Resistance</p> <p>Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables)</p> <p>High Vapor Conditions</p> <p>Green Cat System</p>	<p>No No Yes No No</p> <p>&gt;= 70 kPa &gt;= 5.0 g/s &lt;= 10,000.0 &gt;= 20 kPa &lt;= 256 &gt;= -20 deg. C &lt;= 150 &gt;= -20 deg. C (or OBD Coolant Enable Criteria = TRUE)</p> <p>Not Active Not Active Not Active</p> <p>= Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>&gt;= 0.1 seconds</p> <p>Not Present</p> <p>= Not Valid,</p>	<p>Frequency: Continuous Monitoring in 100ms loop.</p> <p>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 37.5 seconds ( 375 samples ) before comparing to their respective failure thresholds.</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

[illegible]



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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):</p> <p>Deceleration Idle Cruise Light Acceleration Heavy Acceleration</p> <p>(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).</p>	A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA  100 100 100 100 100		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Too Rich Bank 1	P2097	<p>Determines if the post catalyst O2 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.</p> <p>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.</p> <p>Note: When the post catalyst O2 voltage is too rich, the post catalyst O2 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</p>	<p>The Average Integral Offset % Authority</p> <p>AND</p> <p>The Average Total Offset % Authority</p> <p>(Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria)</p> <p>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 <math>\geq 18\%</math> for <math>\geq 1.0</math> seconds.</p> <p>Diagnosis resumes if the purge valve is closed OR the percent vapor is <math>\leq 14\%</math> for <math>\geq 5.0</math> seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p><math>\leq -98.0\%</math></p> <p><math>\leq -70.0\%</math></p> <p>If the P2097 is actively failing then the Average Integral Offset must be <math>&gt; -98.0\%</math> and the Average Total Offset must be <math>&gt; -70.0\%</math> for the diagnostic to report a pass.</p>	Same as P2096	Same as P2096	<p>Frequency: Continuous Monitoring in 100ms loop.</p> <p>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 37.5 seconds ( 375 samples) before comparing to their respective failure thresholds.</p>	Type B, 2 Trips

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst O2 sensor that is within its optimal operating range (neither rich nor lean).						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)) >  OR  Difference between modeled position (modeled = MIN (Commanded vs. Commanded Filtered)) and measured throttle position >	8.48 percent             8.48 percent	TPS minimum learn is not active AND  Powertrain Relay Contact1 Fault is FALSE (no P1682 fault) AND  Throttle Control is not in Service or DVT control AND  Throttle is being Controlled  AND  ( (Engine Running AND Run/Crank Voltage) > 5.50 Volts OR Run Crank Voltage) > 8.41 Volts  AND  ( PT Relay Command On OR ( (Engine Running AND Powertrain Relay Voltage) > 5.50 Volts OR Powertrain Relay Voltage) )	> 5.50 Volts  > 8.41 Volts      > 5.50 Volts  > 8.41 Volts	15 counts;  12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	52.71 percent	TPS minimum learn active AND  Powertrain Relay Contact1 Fault is FALSE (no P1682 fault) AND  Throttle Control is not in Service or DVT control	= TRUE	11 counts;  12.5 ms/count in the primary processor	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< 0.4625 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	19 / 39 counts; or  14 counts continuous;  12.5 ms/count in the main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	4.7500 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P06A3	19 / 39 counts; or  14 counts continuous;  12.5 ms/count in the main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 <	0.3250 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P0697	19 / 39 counts; or  14 counts continuous;  12.5 ms/count in the main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	2.6000 % Vref	Run/Crank voltage  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  P0697	19 / 39 counts; or  14 counts continuous;  12.5 ms/count in the main processor	Type A, 1 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  No TPS sensor faults  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  (P0122, P0123, P0222, P0223)  P06A3	79 / 159 counts; or  58 counts continuous;  3.125 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min TPS1 ) and (normalized min TPS2) >	5.000 % Vref	Run/Crank voltage  No TPS sensor faults  No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts  (P0122, P0123, P0222, P0223)  P06A3	79 / 159 counts; or  58 counts continuous;  3.125 ms/count in the main processor	

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	5.000 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position	Run/Crank voltage  No APP sensor faults  No 5V reference errors or faultst for # 3 & # 4 5V reference circuits	> 6.41 Volts  (P2122, P2123,P2127, P2128)  (P06A3, P0697)	19 / 39 counts intermittent; or  15 counts continuous,  12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1 ) and (normalized min APP2) >	5.000 % Vref	Run/Crank voltage  No APP sensor faults  No 5V reference errors or faultst for # 3 & # 4 5V reference circuits	> 6.41 Volts  (P2122, P2123,P2127, P2128)  (P06A3, P0697)	19 / 39 counts intermittent; or  15 counts continuous,  12.5 ms/count in the main processor	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 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	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	<p>&gt;= 11 Volts &gt;= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  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 Engine Run Time	>= 11 Volts >= 1 Seconds  P062B not FA or TFTK	10.00 failures out of 20.00 samples  100 ms /sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >  AND  Number of learn attempts >	0.5740 % Vref   10 counts	Run/Crank voltage  TPS minimum learn is active  No previous TPS min learn values stored in long term memory	> 6.41 Volts  = TRUE	2.0 secs	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 2 Circuit Low	P2184	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 2 Circuit High	P2185	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 2 Circuit Intermittent/ Erratic	P2186	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_TS2_Erratic_TFTK O</p> <p>EECR_TS2_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6  The calculated high and low limits for the next reading use the following calibrations:  Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	    10.0 seconds -60.0 °C 150.0 °C  10.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  7.0 seconds -60.0 °C 150.0 °C				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Air- Fuel Ratio Imbalance	P219A	<p>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 O2 voltage is used to generate a variance metric that represents the statistical variation of the O2 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).</p> <p>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.</p> <p>The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table</p>	<p>Standard Mode Filtered Ratio</p> <p>The EWMA calculation uses the weighting coefficient from the following supporting table: <b>P219A EWMA Coefficient</b></p> <p>For this program, the Optional Mode is NOT used</p> <p>Optional Mode Filtered Ratio</p> <p>The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode:</p>	<p>&gt; 0.50</p> <p>If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.45 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.</p> <p>&gt; 1.00</p> <p>If the diagnostic has reported a failure on the prior trip, the Optional Mode Filtered Ratio must fall below 0.50 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.</p>	<p>The A/F imbalance diagnostic is enabled</p> <p>System Voltage</p> <p>Fuel Level</p> <p>Engine Coolant Temperature</p> <p>Cumulative engine run time</p> <p>Diagnostic enabled at Idle (regardless of other operating conditions)</p> <p>Engine speed range</p> <p>Engine speed delta during a short term sample period</p> <p>Mass Airflow (MAF) range</p> <p>Cumulative delta MAF during a short term sample period</p> <p>Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF</p>	<p>No lower than 11.0 Volts for more than 0.2 seconds</p> <p>&gt; 10.0 % The diagnostic will disregard the fuel level criteria if the fuel sender is faulty.</p> <p>&gt; -20 deg. C (or OBD Coolant Enable Criteria = TRUE)</p> <p>&gt; 0.0 seconds</p> <p>No</p> <p>1,100 to 4,000 RPM</p> <p>&lt; 180 RPM</p> <p>5 to 1,000 g/s</p> <p>&lt; 4 g/s</p> <p>&lt; 0.75 g/s</p>	<p>Minimum of 1 test per trip, up to 10 tests per trip during RSR or FIR.</p> <p>The front O2 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, 16.80 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</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p><b>P219A Variance Threshold Bank1 Table</b> ) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table <b>P219A Normalizer Bank1 Table</b> ). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table <b>P219A Quality Factor Bank1 Table</b> ). 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.</p> <p>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 in a positive Filtered</p>	<b>P219A EWMA Coefficient Opt Table</b>		<p>= 0.100</p> <p>Air Per Cylinder (APC)</p> <p>APC delta during short term sample period</p> <p>Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.100</p> <p>Spark Advance</p> <p>Throttle Area (percent of max)</p> <p>Intake Cam Phaser Angle</p> <p>Exhaust Cam Phaser Angle</p> <p>-----</p> <p>Electronic Waste Gate (eWG) present</p> <p>If eWG = yes then Waste Gate Position</p> <p>Intrusive eWG Feature</p> <p>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.</p> <p>Intrusive Waste Gate Position Min</p>	<p>160 to 650 mg/cylinder</p> <p>&lt; 75 mg/cylinder</p> <p>&lt; 10.00 percent</p> <p>0 to 100 degrees</p> <p>2 to 200 percent</p> <p>0 to 100 degrees</p> <p>0 to 100 degrees</p> <p>-----</p> <p>Yes</p> <p>-5.0 to 105.0</p> <p>Disabled</p> <p>25.0</p>	<p>made within 5 minutes of operation.</p> <p>For RSR or FIR, 20 tests must complete before the diagnostic can report.</p>	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>Ratio.</p> <p>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.</p> <p>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.</p> <p>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 supporting</p>			<p>Intrusive Waste Gate Position Max</p> <p>-----</p> <p>Active Fuel Management Firing Fraction</p> <p>if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations</p> <p>Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response</p> <p>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.</p> <p>-----</p> <p>For programs using multi-step cam profiles:</p> <p>High Lift Cam Profile will use:</p> <p>Low Lift Cam Profile will use:</p>	<p>100.0</p> <p>-----</p> <p>0.00 to 1.01</p> <p>0.00 to 1.00</p> <p>Disabled</p> <p>&gt;= 0.00</p> <p>-----</p> <p>Standard Mode Filtered Ratio</p> <p>Standard Mode Filtered Ratio</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		tables: <b>P219A Variance Threshold Bank1 Opt Table</b> <b>P219A Normalizer Bank1 Opt Table</b> , and <b>P219A Quality Factor Bank1 Opt Table</b>			<p>Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table <b>P219A Quality Factor Bank1 Table</b> ). 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.</p> <p>Fuel Control Status Closed Loop and Long Term FT Enabled for:</p> <p>Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width</p> <p>O2 learned htr resistance</p> <p>Rapid Step Response (RSR):</p>	<p>&gt;= 0.99</p> <p>&gt;= 1.2 seconds (Please see "<b>Closed Loop Enable Clarification</b>" and "<b>Long Term FT Enable Criteria</b>" in Supporting Tables)</p> <p>Not active Not on Not active Not intrusive Not intrusive Not Active</p> <p>Normal Not Active Above min pulse limit</p> <p>= Valid (the O2 heater resistance has learned since NVM reset)</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by</p> <p>Once triggered, the filtered ratio is reset to:</p> <p>Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:</p> <p>No Fault Active for:</p>	<p>&gt;= 0.50</p> <p>&gt;= 0.50</p> <p>0.00</p> <p>0.00</p> <p>EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA WRAF_Bank_1_FA</p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (applications with LIN MAF)	P2228	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO Pressure	< 50.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (applications with LIN MAF)	P2229	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO Pressure	> 115.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent (applications with LIN MAF)	P2230	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current BARO reading - BARO reading from 25 milliseconds previous)</p>	<p>&gt; 100 kPa</p> <p>40 consecutive BARO readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type A, 1 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM)	P2237	<p>This DTC determines if the B1S1 WRAF O2 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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).</p>	<p>The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is &gt; 1.2V and reference cell voltage is &lt; 1.2V</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>This application uses the following type of WRAF sensor:</p> <p><u>For NGK_ZFAS_U2</u></p> <p><u>For Bosch_LSU_4p9</u></p>	<p>The ASIC provides a fault indication when the pumping current circuit fails the following criteria;</p> <p>Based on the type of WRAF sensor used;</p> <p>CeWRSg_e_NGK_ZF AS_U2</p> <p>element resistance &gt; 400 ohms</p> <p>pump cell reference resistance &gt; Nernst</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>		

21OBDG03D ECM Summary Tables

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

**21OBDG03D ECM Summary Tables**

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Performance Bank 1 (For use with WRAF - non E80	P223C	<p>This DTC determines if the WRAF O2 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.</p> <p>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.</p>	Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO.	<p>The three pump current fault regions are:</p> <p>A) Pump current &gt; 5.00 ma</p> <p>B) Pump current ≤ 0.30 ma and ≥ -0.30 ma</p> <p>C) Pump current &lt; -0.10 ma</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p> <p>Test starts when time in DFCO</p> <p>Test stops when time in DFCO</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p> <p>≥ 5.0 seconds</p> <p>&gt; 10.0 seconds</p>	<p>Region A: 128 failures out of 160 samples</p> <p>OR</p> <p>Region B: 128 failures out of 160 samples</p> <p>OR</p> <p>Region C: 128 failures out of 160 samples</p> <p>Sample rate is 25 msec.</p> <p>Test enabled during DFCO.</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Reference Resistance Out Of Range Bank 1	P223E	<p>This DTC determines if the WRAF O2 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.</p> <p>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.</p>	Measured Reference cell temperature	<p>&lt; 650 Deg C OR &gt; 1,000.0 Deg C</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then Delay after WRAF circuit diagnostic delay *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>	<p>128 failures out of 160 samples</p> <p>Sample rate is 25 msec</p> <p>Continuous</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM)	P2243	<p>This DTC determines if the B1S1 WRAF O2 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).</p>	<p>The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is &gt; 1.2V and pump cell voltage is &lt; 1.2V</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).</p>	<p>The ASIC provides a fault indication when the reference voltage circuit fails the following criteria;</p> <p>[Nernst signal - 0.45] &gt;1.0 volts</p> <p>Note: the faults must exist for more than 10 msec to qualify for a fail flag.</p>	<p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Reference Ground Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM	P2251	<p>This DTC determines if the B1S1 WRAF O2 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).</p>	<p>The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is &gt; 1.2V and reference cell voltage is &gt; 1.2V</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>≥ 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve - Mechanical Turbocharge r with wastegate. Not supercharge r with mechanical compressor	P2261	This DTC indicates the compressor recirculation valve being stuck closed. This diagnostic is active at coast down let off conditions, where an airflow pulsation criteria is used as basis of this diagnostic.	When measuring time accumulated air mass flow derivate boost pressure is high pass filtered with filter frequency ***** A failure is detected when Acc. Filtered Air Mass Flow  or  Acc.Der.Filtered boost pressure	< 1.00 Second,   = 10.91 Hz *****  > 120.00 g/s      > 50,000.00 kPa/s	Diagnostic enabled ***** Engine speed ***** Bypass valve commanded open duty cycle For at least ***** Pressure ratio over the compressor relative limit   Condition keep true for x seconds extra ***** Negative transient -> TRUE Relative boost and Pressure derivate  Hysteresis negative transient -> FALSE Relative boost or Pressure derivate ***** No Active DTCs:	True ***** >= 1,200 rpm *****  > 10.00 % >= 0.30 s ***** > refer to <b>P00C4 P2261: Compressor Surge Line</b> in Supporting Tables  1.00 s ***** TRUE  >= 20.00 kPa <= -160.00 kPa/s    < 0.00 kPa > 65.00 kPa/s ***** BSTR_b_TurboBypassCkt FA BSTR_b_BoostSnsrFA MAF_SensorFA	8 Failed tests out of 10 tests  25ms/ sample	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	<p>The P2270 diagnostic is the first in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow.</p> <p>This fault is set if the secondary O2 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.</p>	<p>Post O2 sensor signal</p> <p>AND</p> <p>The Accumulated mass air flow monitored during the Stuck Lean Voltage Test</p>	<p>&lt; 850 mvolts</p> <p>&gt; 74 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013B, P013E, P013F, P2270 or P2271</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Pedal position</p> <p>Engine Airflow</p> <p>Closed loop integral Closed Loop Active</p> <p>Evap</p> <p>Ethanol Estimation in Progress</p> <p>Post fuel cell</p> <p>Crankshaft Torque</p> <p>EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time</p> <p>Transmission Temp</p>	<p>= False</p> <p>= False</p> <p>≤ 3.0 %</p> <p>2.0 ≤ gps ≤ 20.0</p> <p>0.80 ≤ C/L Int ≤ 1.08 = TRUE (Please see “<b>Closed Loop Enable Clarification</b>” in Supporting Tables).</p> <p>not in control of purge</p> <p>= Not Active (Please see “<b>Ethanol Estimation in Progress</b>” in Supporting Tables).</p> <p>= Enabled, refer to <b>Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests</b> for additional info.</p> <p>&lt; 75.0 Nm</p> <p>= not active</p> <p>= not active</p> <p>≥ 60.0 sec</p> <p>≥ -40.0 °C</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted Catalyst temp Fuel State  ===== All of the above met for at least 0.0 seconds, and then check the following  Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)  Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ===== All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested. ===== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	500 ≤ °C ≤ 800 = DFCO possible  =====  1,100 ≤ RPM ≤ 3,000  1,000 ≤ RPM ≤ 3,100  34.2 ≤ MPH ≤ 80.8  31.1 ≤ MPH ≤ 87.0  0.95 ≤ EQR ≤ 1.10 < 60.0 Nm		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	<p>The P2271 diagnostic is the fourth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &amp; P013B. This DTC determines if the secondary O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.</p> <p>This fault is set if the secondary O2 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.</p>	<p>Post O2 sensor signal</p> <p>AND</p> <p>The Accumulated mass air flow monitored during the Stuck Rich Voltage Test</p>	<p>&gt; 100 mvolts</p> <p>&gt; 25.0 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013B, P013E, P013F or P2270</p> <p>&gt; 11.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Low	P227C	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO C Pressure	< 50.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit High	P227D	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO C Pressure	> 115.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)</p>	<p>&gt; 100 kPa</p> <p>40 consecutive BARO C readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	>= <b>P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low</b> Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure   Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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 active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	True  ≥ 11 Volts  > 0.275 MPa   Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error -  10.00 second failures out of 12.50 second samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	<= <b>P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high</b> Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure  Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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 active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	True  ≥ 11 Volts  > 0.275 MPa  Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error -  10.00 second failures out of 12.50 second samples	Type A, 1 Trips

210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 100 \Omega$ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 100 \Omega$ impedance between signal and controller power	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 100 \Omega$ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 100 \Omega$ impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 100 \Omega$ impedance between signal and controller ground	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples  100 msec rate	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 100 \Omega$ impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (EST) 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 100 \Omega$ impedance between signal and controller ground	Engine running  Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples  100 msec rate	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 100 \Omega$ impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>20 Failures out of 25 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)  OR Rolling count error - Serial Communication message (\$189/\$199) rolling count index value  OR  Range Error - Serial Communication message - (\$189/\$199) TCM Requested Torque Increase  OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message   Message <> previous message rolling count value + one   > 350 Nm   Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status  Power Mode  Ignition Voltage  Engine Running Run/Crank Active  No Serial communication loss to TCM (U0101)	Enabled  = Run  > 6.41 volts  = True > 0.50 Sec  No loss of communication	>= 16 failures out of 20 samples.  Performed on every received message  >= 6 Rolling count errors out of 10 samples.  Performed on every received message  >= 6 range errors out of 10 samples.  Performed on every received message  >= 4 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

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



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake System Control Module Requested MIL Illumination	P25A2	Monitors the Brake System Control Module MIL request message to determine when the Brake System Control Module has detected a MIL illuminating fault.	Brake System Control Module Emissions-Related DTC set and module is requesting MIL	Brake System Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up $\geq$ 3 seconds	Continuous	Type A, No MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Trim Circuit/Open Bank 1 Sensor 1 (For use with WRAF & E81 or GenIV ECM)	P2626	<p>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.</p> <p>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.</p>	<p>B1S1 Trim circuit Open test.</p> <p>This application uses the following type of WRAF sensor:</p> <p>The ASIC Open trim test detects a fault if the trim circuit resistance is:</p> <p>For NGK_ZFAS_U2</p> <p>For Bosch_LSU_4p9</p> <p>Note: This ASIC is referred to as ATIC142 (Continental).</p>	<p>CeWRSG_e_NGK_ZFAS_U2</p> <p>&gt; 4,644 ohms</p> <p>&gt; 379.5 ohms</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Run/Crank Signal</p> <p>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>Fuel Control State</p> <p>Off Stoich Closed Loop</p> <p>DFCO</p> <p>WRAF Pump current</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>changes from false to true</p> <p>≥ 20.0 seconds</p> <p>= Closed Loop</p> <p>= Not active</p> <p>= Not active</p> <p>≤ 1.0 ma</p>	<p>1 fail counts out of 1 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips
			<p>B1S1 Trim circuit Open test.</p> <p>This application uses the following type of WRAF sensor:</p> <p>The ASIC Open trim test detects a fault if the trim circuit resistance is:</p> <p>For NGK_ZFAS_U2</p> <p>For Bosch_LSU_4p9</p>	<p>CeWRSG_e_NGK_ZFAS_U2</p> <p>&lt; 118 ohms or &gt; 4K ohms</p> <p>&lt;30 ohms or &gt;300 ohms</p> <p>AND</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Run/Crank Signal</p> <p>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>Fuel Control State</p> <p>Off Stoich Closed Loop</p> <p>DFCO</p> <p>WRAF Pump current</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>changes from false to true</p> <p>≥ 20.0 seconds</p> <p>= Closed Loop</p> <p>= Not active</p> <p>= Not active</p>	<p>1 fail counts out of 1 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	

21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Off Timer Performance	P262B	<p>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).</p> <p>Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.</p> <p>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.</p>	<p>Count Up Test:</p> <p>Time difference between the current read and the previous read of the timer</p> <p>Range Test:</p> <p>The variation of the HWIO timer and mirror timer is</p>	<p>&gt; 1.50 seconds</p> <p>&gt; 0.25 %.</p>			<p>Count Up Test:</p> <p>4 failures out of 20 samples</p> <p>1 sec / sample</p> <p>Continuous while run/crank is not active and until controller shutdown is initiated.</p> <p>Range Test:</p> <p>Once per trip when controller shutdown is initiated or run/crank becomes active.</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump "A" Low Flow / Performance	P2635	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	<= Low Threshold [Supporting Table] <b>P2635 Threshold Low</b>  OR  >= High Threshold [Supporting Table] <b>P2635 Threshold High</b>	a) Diagnostic enabled [FDBR_b_FSRD]  b) Timer Engine Running [FDBR_t_EngModeRunC oarse]  c1) Fuel Flow Rate Valid  c2) Ambient Air Pressure Value Defaulted  c3) FDB_FuelPresSnsrCktFA  c4) Reference Voltage Fault Status [DTC P0641]  c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [HCIR_b_GshtFA DTC P20CD]  c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]  c7) Use Calculated Flow Performance Fault Thresholds [FDBR_b_UseCalcFSRD _FitThrshs]  c8) Engine Speed Status Valid  c9) FAB_FuelPmpCktFA  c10) Fuel Control Enable	a) == TRUE  b) >= 30.00 seconds  c1) == TRUE  c2) <> TRUE  c3) <> TRUE  c4) <> TRUE  c5) <> TRUE  c6) <> TRUE  c7) <> TRUE  c8] == TRUE  c9] <> TRUE  c10) <> TRUE	1 sample / 12.5 millisec	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fault Active [DTC P12A6]  c11) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]  c12) Fuel Pump Speed Fault Active [DTC P129F]  c13) CAN Sensor Bus message \$0C3 Comm Fault [CFMR_b_FTZM_Info1_U codeCmFA DTC P165C]  c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_ UcodeCmFA DTC]  c15) Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]  c16) Sensor Bus Relay On  d) Emissions Fuel Level Low [Message \$3FB]  e) Fuel Control Enable  f) Fuel Pump Control State  g) Run_Crank input circuit voltage  h) High Pres Fuel Pump	c11) <> TRUE  c12) <> TRUE  c13) <> TRUE  c14) <> TRUE  c15) == CeFDBR_e_WiredTo_FT ZM  c16) == TRUE  d) <> TRUE  e) == TRUE  f) == NORMAL  g) 11.00 volts <= Run_Crank_V <= 32.00 volts  h) <> TRUE		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Mode Management Enabled  j) High Pres Fuel Pump Control Mode  k) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]  m1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B \$0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC]  m2) CAN Sensor Bus message \$0C3_Available  m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]  n) Timer - Diagnostic Enable	j) <> Disabled Mode AND a8b) <> ZeroFlow Mode  k) 0.05 grams/sec <= InstFuelFlow <= Max Allowed Flow [Supporting Table] <b>P2635 Max Fuel Flow</b>  m1) <> TRUE  m2) == TRUE  m3) <> TRUE  n) > 2.00 seconds		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to ground is detected.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: $\leq 0.5 \Omega$ impedance between output and controller ground	Run/Crank Voltage  Remote Vehicle Start is not active	Voltage $\geq 11.00$ volts	50 failures out of 63 samples  50 ms / sample	Type B, No MIL  NO MIL  Note: In certain controllers P0650 may also set (MIL Control Open Circuit)



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to power is detected.	Voltage high during driver on state (indicates short to power)	Short to power: $\leq 0.5 \Omega$ impedance between output and controller power	Run/Crank Voltage  Remote Vehicle Start is not active	Voltage $\geq 11.00$ volts	4 failures out of 5 samples  50 ms / sample	Type B, No MIL  NO MIL

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Control Circuit/Open	P26B7	Controller specific output driver circuit detects an open circuit in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Driver reports an open control circuit condition	= TRUE	Diagnostic is Enabled  Run Crank Ignition in Range  Engine not cranking  Engine Diag System  Driver control circuit open status is not	  = True  = True  = Enabled  = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Bypass Valve C Range/ Performance	P26BB	This DTC will detect when the valve cannot achieve the desired position within a calibrated threshold (degrees (angle)) after the Target position has stabilized for a calibratable amount of time or is moving slower than a calibratable rate. A failure of this diagnostic would indicate a slow or stuck part.	Absolute position deviation between target and actual	> 10.0 Degrees	Diagnostic is Enabled  No DTCs   Closed Loop position control Soft Closing function Soft Opening function Valve anti-sticking routine Engine Diag System Engine not cranking Run Crank Ignition in Range  Engine Outlet Coolant OR OBD Coolant Enable Criteria	VECR_MRV_LoC_FA VECR_MRV_PstnSnsrCkt_FA VECR_MRV_PstnSnsrCkt_TFTKO VECR_MRV_PstnPerf_FA  = Active = Inactive = Inactive = Inactive = Enabled = True  = True  ≥ -20.0 °C  = TRUE	8 seconds out of a 10 seconds window	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

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# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run**  Change in Two Consecutive Coolant Valve Position Command ]  ** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.	greater than 37.00 seconds  <= 5.00 ° for more than 3.00 seconds		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Block Coolant Valve Stuck Closed	P26C2	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is below the 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.	Absolute value of the position difference between position request and position feedback  AND  Coolant Valve Position Feedback	>= 5.00 °   < 50.00 °	Diagnostic is Enabled  The following shall be satisfied for [ 12V System Voltage  VECR_BRV_PstnFdbk_A v VECR_BRV_PstnFdbk_F ol VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP  VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA  PowertrainRelayStateOn_ FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690  Powertrain Relay Commanded On  Coolant Valve Position Command  If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [ Engine Block Coolant Enable Temperature ]  Coolant Valve Calibration	>= 0.10 seconds  >= 11.00 V (hystersis disable < 10.00 V)     = No Fault Pending  = No Fault Active  = No Fault Active   = True  = between -5.00 ° and 115.00 °  = 1.00  >= -40.00 °C (hystersis disable <= -41.00 °C)		Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run**  Change in Two Consecutive Coolant Valve Position Command ]  ** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.	Has not been triggered for greater than 37.00 seconds  <= 5.00 ° for more than 3.00 seconds		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Overspeed	P26CE	<p>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.</p> <p>There are two different failure criteria as the pump feedback speed is dependent on the system voltage.</p>	<p>Any of the following fail criteria is met:</p> <p><b>Criteria 1:</b> Filtered (Pump Command Speed - Pump Feedback Speed)</p> <p>12V System Voltage</p> <p><b>Criteria 2:</b> Filtered (Pump Command Speed - Pump Feedback Speed)</p> <p>12V System Voltage</p>	<p><b>P26CE Pump Overspeed Fail &lt; Threshold</b></p> <p><math>\geq -9,999.00 \text{ V}</math></p> <p><b>P26CE Pump Overspeed Fail Threshold Low &lt; Voltage</b></p> <p><math>&lt; -9,999.00 \text{ V}</math></p>	<p>Diagnostic is Enabled</p> <p>Difference in Pump Command Speed from previous data sample to present data sample</p> <p>=====</p> <p>Any of the following criteria is met:</p> <p><b>Criteria 1:</b> Calibration to use fault pending is TRUE</p> <p>PECR_EMP_SpeedOOR_L_FP PECR_EMP_SpeedOOR_H_FP</p> <p><b>Criteria 2:</b> Calibration to use fault pending is FALSE</p> <p>If either condition is achieved PECR_EMP_SpeedOOR_L_FA AND PECR_EMP_SpeedOOR_L_TFTKO</p> <p>OR</p> <p>PECR_EMP_SpeedOOR_H_FA AND PECR_EMP_SpeedOOR_H_TFTKO</p> <p>=====</p>	<p><math>&lt; 50.00 \text{ RPM for } \geq 3.00 \text{ s}</math></p> <p><math>= 1.00 (1 \text{ is TRUE})</math></p> <p><math>= \text{Not Active}</math></p> <p><math>= 1.00 (0 \text{ is FALSE})</math></p> <p><math>= \text{Not Active}</math></p> <p><math>= \text{Not Active}</math></p>	8 seconds out of a 10 seconds window	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

[illegible]

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	>= 200 KOhms impedance between signal and controller ground.	Starter relay pinion diag enable	Enabled	40 failures out of 50 samples	Type B, 2 Trips
			Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.		Engine speed  Run Crank voltage	>= 0.00 RPM  >= 11.00 volts	50 ms / sample	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	<p><math>\leq 0.5</math> Ohms impedance between signal and controller ground</p>	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p><math>\geq 0.00</math> RPM</p> <p><math>\geq 6.41</math> volts</p>	<p>8 failures out of 10 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	<p><math>\leq 0.5</math> Ohms impedance between signal and controller power</p>	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p><math>\geq 0.00</math> RPM</p> <p><math>\geq 11.00</math> volts</p>	<p>40 failures out of 50 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wastegate Position Sensor "A" Circuit Low	P2AB8	Detects a continuous or intermittent short low or open in eWG position circuit by monitoring the eWG position sensor percent Vref and failing the diagnostic when the eWG percent Vref is too low. This diagnostic only runs when powertrain relay voltage is high enough. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	< 5.0 %	Diagnostic enabled ***** Powertrain relay voltage ***** Engine does not crank Diagnostic system not disabled	True ***** >= 11.0 Volts *****	10 failures out of 12 samples  100ms / sample	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wastegate Position Sensor "A" Circuit High	P2AB9	Detects a continuous or intermittent short high in eWG position circuit by monitoring the eWG position sensor percent Vref and failing the diagnostic when the eWG percent Vref is too high. This diagnostic only runs when powertrain relay voltage is high enough. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	> 95.0 %	Diagnostic enabled ***** Powertrain relay voltage ***** Engine does not crank Diagnostic system not disabled	True ***** >= 11.0 Volts *****	10 failures out of 12 samples  100ms / sample	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 4 Circuit Low	P2AFE	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr4  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 4 Circuit High	P2AFF	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

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## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True          = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True          = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True          = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Catalyst Warm up enabled (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True   = True   = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F-Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Catalyst Warm up enabled (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True   = True   = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Missing Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Catalyst Warm up enabled (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True          = True          = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Catalyst Warm up enabled (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True   = True   = True	50.00 to 100.00 samples  Continuous Cylinder event sample rate	Type B, 2 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 5 Circuit Low	P2B2D	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to:  Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

**21OBDG03D ECM Summary Tables**

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 5 Circuit High	P2B2E	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 2 Control Circuit Open	P2B33	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 2 Control Circuit Low Voltage	P2B34	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 2 Control Circuit High Voltage	P2B35	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 2 Circuit Open	P2B39	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 2 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 2 Circuit Low Voltage	P2B3A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 2 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 2 Circuit High Voltage	P2B3B	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 2 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 2 Performance	P2B4F	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 2	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  System voltage  Engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 2 Performance	P2B51	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 2	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  System voltage  Engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 2 Pin Stuck	P2B53	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 2 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  System voltage  Engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wastegate Position Sensor "A" Circuit Performance	P2B81	<p>Detects a performance failure on the electronic wastegate acuator system</p> <p>The diagnose will fail if at least one of supervision fails.</p> <ul style="list-style-type: none"> <li>* Position deviation supervision</li> <li>* Actuator current supervision</li> <li>* Actuator Duty Cycle supervision</li> </ul> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.</p>	Actuator is in Normal operation Abs(Position Error) for at least	> 5.0 % > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is not in cold start conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	Type A, 1 Trips
			Abs(Actuator current) for at least	> 1.0 A > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is not in cold start conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	
			Abs(Actuator DC) for at least	> 40.0 % DC > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is not in cold start conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Underspeed	P2B85	<p>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 underspeed condition is when the commanded speed is greater than the component actual speed. The speed difference is filtered and when the difference is greater than the underspeed calibrated fault threshold, the diagnostic reports a FAIL. If filtered speed difference does not exceed the underspeed calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met.</p> <p>There are two different failure criteria as the pump feedback speed is dependent on the system voltage.</p>	<p>Any of the following fail criteria is met:</p> <p>Criteria1:</p> <p>Filtered (Pump Command Speed - Pump Feedback Speed)</p> <p>12V System Voltage</p> <p>Criteria 2:</p> <p>Filtered (Pump Command Speed - Pump Feedback Speed)</p> <p>12V System Voltage</p>	<p><b>P2B85 Pump Underspeed Fail &gt; Threshold</b></p> <p><math>\geq -9,999.00 \text{ V}</math></p> <p><b>P2B85 Pump Underspeed Fail Threshold Low &gt; Voltage</b></p> <p><math>&lt; -9,999.00 \text{ V}</math></p>	<p>Diagnostic is Enabled</p> <p>Difference in Pump Command Speed from previous data sample to present data sample</p> <p>=====</p> <p>Any of the following criteria is met:</p> <p><b>Criteria 1:</b> Calibration to use fault pending is TRUE</p> <p>PECR_EMP_SpeedOOR_L_FP PECR_EMP_SpeedOOR_H_FP</p> <p><b>Criteria 2:</b> Calibration to use fault pending is FALSE</p> <p>If either condition is achieved</p> <p>PECR_EMP_SpeedOOR_L_FA AND PECR_EMP_SpeedOOR_L_TFTKO</p> <p>OR</p> <p>PECR_EMP_SpeedOOR_H_FA AND PECR_EMP_SpeedOOR_H_TFTKO</p>	<p><math>&lt; 50.00 \text{ RPM for } \geq 3.00 \text{ s}</math></p> <p><math>= 1.00 (1 \text{ is TRUE})</math></p> <p><math>= \text{Not Active}</math></p> <p><math>= 1.00 (0 \text{ is FALSE})</math></p> <p><math>= \text{Not Active}</math></p> <p><math>= \text{Not Active}</math></p>	8 seconds out of a 10 seconds window	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>=====</p> <p>PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_Fol</p> <p>= Not Active</p> <p>Either of the following criteria is met:</p> <p><b>Criteria 1:</b> Engine inlet coolant temperature check calibration is TRUE</p> <p>= 0 (1 is TRUE)</p> <p><b>Criteria 2:</b> a) EECR_EngineInlet_FA b) Engine Inlet Coolant Temperature</p> <p>= Not Active &gt;= -40.00 °C</p> <p>All of the following criteria are met for</p> <p>12V System Voltage</p> <p>&gt; 11.00 V (with hysteresis disable &lt; 10.00 V)</p> <p>Pump Command Speed</p> <p>&gt;= 300.00 RPM</p> <p>Pump Enable</p> <p>= True</p>			

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wastegate A Position Exceeded Learning Limit	P2B93	This DTC indicates a failure that the close position learning of the electronic waste gate 'A' was not successful. The learned raw close position was out of the boundaries. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	eWG raw position ***** OR ***** Never learned a valid Close Position and Engine speed	> 85.0 % ***** ***** = FALSE  > 1000 rpm	Diagnostic enabled when electronic waste gate is present.	True	on event	Type A, 1 Trips
			eWG raw position and eWG Stable condition detected: Position deviation Stable Time	< 50.0 %  < 1.00 % > 0.10 sec	Diagnostic enabled when electronic waste gate is present. ***** Coolant Temperature ***** No DTCs:	True  ***** >= 80.0 °C *****	on event	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder</p> <p>Or</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder</p>	<p>=&lt;</p> <p><b>P2B96 - Opening Magnitude Misisng Pulse Fail Limit</b></p> <p>(See supporting table)</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)</p> <p>OBD Manufacturer Enable Counter</p> <p>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:</p> <p>Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure</p> <p>In addition, Multi Pulse Strategy Is Enabled and Active Per the following:</p> <p>Engine Speed</p> <p>Accel Position</p> <p>Engine Run Time</p>	<p>= True</p> <p>= True</p> <p>= 0</p> <p>&lt; 500.00 degC &gt; -12.00 degC &lt;= 72.00 degC &gt;= 72.00 KPa</p> <p>&gt;= 450.00 RPM &lt;= 2,800.00 RPM</p> <p>&lt;= 35.00 Pct</p> <p>&lt; 100 seconds</p>	<p>Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.</p> <p>Frequency: 100ms</p> <p>Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached</p>	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:</p> <p>Catalyst Temperature AND Engine Run Time</p> <p>OR</p> <p>Engine Run Time</p> <p>OR</p> <p>Barometric Pressure</p> <p>Multi Pulse Strategy will exit per the following:</p> <p>Engine Speed OR Accel Position</p> <p>Engine Run Time</p>	<p>&gt;= 700.00 degC</p> <p>&gt;= 0.00 seconds</p> <p>&gt;</p> <p><b>P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit</b></p> <p>This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.</p> <p>&lt; 72.00 KPa</p> <p>&gt; 3,000.00 RPM</p> <p>&gt; 40.00 Pct</p> <p>&gt;= 100 seconds</p>		

# 210BDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr_FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTK O FHPR_b_FRP_SnsrCkt_F A FHPR_b_FRP_SnsrCkt_T FTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTK O TransmissionEngagedStat e_FA EngineTorqueEstInaccura te FuelPumpRlyCktFA		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Or  Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder	=< <b>P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit</b> (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)  Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)  Above Engine Temperature	= True  = True  > --30.00 C	0.25 Second Fail count out of 1.00 seconds Samples  Continuous	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Stuck/ Stalled	P2BA2	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	>= 10.00 RPM	Diagnostic is Enabled  12V System Voltage  PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_Fol  Any of the following criteria are met for  a) Pump Enable  b) Pump Command Speed in Range	> 11.00 V (with hysteresis disable < 10.00 V)   = Not Active  >= 3.00 s  = False  0.00 RPM to 4.00 RPM	8 seconds out of a 10 seconds window	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 4 Circuit Intermittent/ Erratic	P2BB4	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr4</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_TS4_Erratic_TFTK O</p> <p>EECR_TS4_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5</p> <p>Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6</p> <p>The calculated high and low limits for the next reading use the following calibrations:</p> <p>Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p> <p>Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit</p>	<p>10.0 seconds -60.0 °C 150.0 °C</p> <p>10.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>5.0 seconds -60.0 °C 150.0 °C</p> <p>7.0 seconds -60.0 °C 150.0 °C</p>				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 5 Circuit Intermittent/ Erratic	P2BB5	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_TS5_Erratic_TFTK O</p> <p>EECR_TS5_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6  The calculated high and low limits for the next reading use the following calibrations:  Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	    10.0 seconds -60.0 °C 150.0 °C  10.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  7.0 seconds -60.0 °C 150.0 °C				

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 6 Circuit Low	P2BB8	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	< X Ohms  X is equal to: Temp Sensor 1: 55 Ohms  Temp Sensor 2: 55.0 Ohms  Temp Sensor 3: 41.1 Ohms  Temp Sensor 4: 55.0 Ohms  Temp Sensor 5: 41.1 Ohms  Temp Sensor 6: 55.0 Ohms  Temp Sensor 7: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 6 Circuit High	P2BB9	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature 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)  This program uses a highly configurable sensor reading system.  This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr  Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1  Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2  Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr  Temperature Sensor 4: CeEECR_e_EngCoolantTempSnsr3  Temperature Sensor 5: CeEECR_e_EngCoolantTempSnsr4  Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms  X is equal to: Temp Sensor 1: 174,069 Ohms  Temp Sensor 2: 174,069 Ohms  Temp Sensor 3: 354,667 Ohms  Temp Sensor 4: 174,069 Ohms  Temp Sensor 5: 354,667 Ohms  Temp Sensor 6: 174,069 Ohms  Temp Sensor 7: 174,069 Ohms	Diagnostic is Enabled  Engine run time OR IAT min	> 10.0 seconds  ≥ -20.0 °C	5 seconds out of a 6 seconds window  Continuously sampled	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor 6 Circuit Intermittent/ Erratic	P2BBA	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature 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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</p> <p>Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2</p> <p>Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr</p> <p>Temperature Sensor 4: CeEECR_e_EngCoolant TempSnsr3</p> <p>Temperature Sensor 5: CeEECR_e_EngCoolant TempSnsr4</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	<p>EECR_TS6_Erratic_TFTK O EECR_TS6_CktHiLo_FA</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5  Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6  The calculated high and low limits for the next reading use the following calibrations:  Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	    10.0 seconds -60.0 °C 150.0 °C  10.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  5.0 seconds -60.0 °C 150.0 °C  7.0 seconds -60.0 °C 150.0 °C				

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit  *****Generic Example*****  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 caluculated limits are 101 °C and 73 °C.  The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.  *****	5.0 seconds -60.0 °C 150.0 °C				



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor A Circuit Bank 1	P2C05	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor A Range/ Performance Bank 1	P2C06	Intake Hall Sensor 1 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback failures</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	<p>Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,</p>	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No active PCODES</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor A Circuit Low Bank 1	P2C07	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor A solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor A Circuit High Bank 1	P2C08	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor B Circuit Bank 1	P2C09	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor B Range/ Performance Bank 1	P2C0A	Intake Hall Sensor 2 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback failures</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No active P codes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor B Circuit Low Bank 1	P2C0B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor B Circuit High Bank 1	P2C0C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor C Circuit Bank 1	P2C0D	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor C Range/ Performance Bank 1	P2C0E	Intake Hall Sensor 3 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No Active P codes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor C Circuit Low Bank 1	P2C0F	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor C Circuit High Bank 1	P2C10	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor A Circuit Bank 1	P2C12	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor A Range/ Performance Bank 1	P2C13	Exhaust Hall Sensor 1 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No Active P Codes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor A Circuit Low Bank 1	P2C14	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor A solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	1  > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor A Circuit High Bank 1	P2C15	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor B Circuit Bank 1	P2C16	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor B Range/ Performance Bank 1	P2C17	Exhaust Hall Sensor 2 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback failures</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	<p>Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,</p>	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No Active P Codes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor B Circuit Low Bank 1	P2C18	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Actuator Position Sensor B Circuit High Bank 1	P2C19	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  OR  High Pressure Fuel Pump Delivery Angle	>= 92 °   ≤ 0 °	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure      Barometric Pressure Inlet Air Temp   Fuel Temp  Catalyst Warm up enabled (See Definition in Supporting Material below)  Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True  ≥ 11 Volts  > 0.275 MPa  Enabled when a code clear is not active or not exiting device control  Engine is not cranking   ≥ 70.0 KPA ≥ -20.0 degC  -12 ≤ Temp degC ≤ 132  = True	Windup High/Low  10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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 active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	>= <b>P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low</b> Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure  Catalyst Warm up enabled (See Definition in Supporting Material below)  Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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 active and	True  >= 11 Volts  > 0.275 MPa  = True  Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error -  10.00 second failures out of 12.50 second samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

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



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	<= <b>P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high</b> Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable  Battery Voltage  Low Side Fuel Pressure  Catalyst Warm up enabled (See Definition in Supporting Material below)  Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and 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  ≥ 11 Volts  > 0.275 MPa  = True  Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error -  10.00 second failures out of 12.50 second samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active  Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 132		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature Sensor A/B Correlation	P2C21	Determines if one of the redundant oil temperature sensors is biased or stuck 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 Sensor A to Sensor B.	<b>Fast Cold Start Test</b>  <u>To indicate an fast fail:</u>  Absolute value of Powerup EOT - Powerup ECT  AND Absolute value of Powerup IAT - Powerup ECT  <u>To indicate a fast pass:</u>  Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - Powerup IAT	EOT Temp Diff > <b>FastFailTempDiff</b> (See P0196 details on Supporting Tables Tab)  AND < 16 degrees C  AND < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running  Cold Start Specific EOT Test Conditions:  Use Cold Start Diagnostic  Engine Off Time  Engine Off Timer Validity  No active DTC's	Enabled  = True  Enabled  > 540 Seconds  = True  Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA	Cold Start Fast Test - one failure out of one sample - test performed once per second	Type B, 2 Trips
			<b>Cold Start Test</b>  <u>Pass Condition 1:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - minIAT  OR  <u>Pass Condition 2:</u> Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C  <= 16 Deg C  OR  > 16 Deg C	All three tests (Cold/ Warm/Continuous)  EOT Diagnostic main enable AND Engine Running  Cold Start Specific EOT Test Conditions:  Use Cold Start Diagnostic  Engine Off Time  Engine Off Timer Validity	Enabled  = True  Enabled  > 540 Seconds  = True	Cold Start Regular Test - one failure out of one sample - test performed once per second	

## 210BDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.	
			AND	AND					
			Absolute value of Powerup ECT - minIAT	<= 16 Deg C					
			<b>Warmup Test</b> <u>Warm Up Fail Condition:</u>  EOT  <u>Warm Up Test Pass Condition:</u>  EOT	< 70 Deg C          => 70 Deg C	EOT Diagnostic main enable Engine Running  Warm Up EOT Test Specific Conditions: Use Warm Up EOT Diagnostic  Power up ECT  Power up ECT  Total accumulated engine airflow since engine start  DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled  = True   Disabled   > 200 degrees C  < 200 degrees C  >= <b>P0196_TotalAccumulate dFlow</b> (See P0196 details on Supporting Tables Tab)  Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA	Warm up Tests - one failure out of one sample - test performed once per second		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<b>Continuous Test</b>  <u>Pass Condition:</u>  (Measured Oil Temperature A - Measured Oil Temperature B) OR Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B)  <u>Fail Condition:</u>  (Measured Oil Temperature A - Measured Oil Temperature B) AND Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B)	$\geq 0$ and $\leq 15.8$  OR $\geq 0$ and $\leq 15.8$  $> 15.8$  AND $> 15.8$	Redundant Sensor Enable  EOT Diagnostic main Enable  Engine Running  Continuous EOT Test Specific Conditions:  Power up ECT and ECT  All of three criteria above AND  EOT Model Oil Temperature reach Equilibrium  OR  Use quick transition to equilibrium state and ECT  DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled  Enabled = True  Enabled $\geq -9$ and $\leq 105$ Deg C $\geq 45$ and $\leq 105$ Deg C  $\geq 70$ Deg C  Enabled and  $\geq$ ECT from 5 sec previous  Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA IAT_SensorCircuitFA EngOilModeledTempValid	Continuous Test 8 failures out of 10 samples performed once per second	

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Wastegate Position Sensor A Circuit Performance	P2C9B	<p>Detects a performance failure on the electronic wastegate acuator system during engine cold start conditions. The diagnose will fail if at least one of supervision fails.</p> <ul style="list-style-type: none"> <li>* Position deviation supervision</li> <li>* Actuator current supervision</li> <li>* Actuator Duty Cycle supervision</li> </ul> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.</p>	Actuator is in Normal operation Abs(Position Error) for at least	> 5.0 % > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is in cold stard conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	Type A, 1 Trips
			Abs(Actuator current) for at least	> 1.0 A > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is in cold stard conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	
			Abs(Actuator DC) for at least	> 40.0 % DC > 1.0 sec	Diagnostic enabled ***** Engine not in crank mode  Engine is in cold stard conditions  Diagnostic system not disabled  Device control Component test not active	True *****	25 failures out of 30 samples  100ms / sample	

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 Low Voltage	P3051	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Battery Voltage	1  0  TRUE  TRUE  FALSE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 Low Voltage	P3052	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Battery Voltage	1  0  TRUE  TRUE  FALSE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 High Voltage	P3053	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Battery Voltage	1  0  TRUE  TRUE  FALSE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 High Voltage	P3054	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Battery Voltage	1  0  TRUE  TRUE  FALSE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 1 Performance	P3055	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled	1	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips
					If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	0		
						TRUE		
						TRUE		
						FALSE		
			Engine running OR Engine stopped	for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop				
			Battery Voltage	>= 6.60 Volts				
			Stabilize Mode- Auto- Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled	1		
If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	0							
	TRUE							
	TRUE							
	FALSE							
Engine auto-cranking	for > 0 loops in 6.25 ms loop							
Battery Voltage	>= 6.60 Volts							
Stablize Mode-Auto- Cranking Events: Number of failed auto- cranking events exceeds threshold	> 2 failed auto- cranking events	Diagnostic enabled	1	2 failed auto- crank events out of 3 consecutive auto-crank events				
		If Global B electrical architecture Then (Run/Crank or Accessory)	0					
			TRUE					

210BDG03D ECM Summary Tables

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

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 2 Performance	P3056	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Engine running OR Engine stopped  Battery Voltage	1  0  TRUE  TRUE  FALSE  for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto- Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  Engine auto-cranking  Battery Voltage	1  0  TRUE  TRUE  FALSE  for > 0 loops in 6.25 ms loop  >= 6.60 Volts	16 failed samples out of 32 samples in 6.25 ms loop	
			Stablize Mode-Auto- Cranking Events: Number of failed auto- cranking events exceeds threshold	> 2 failed auto- cranking events	Diagnostic enabled  If Global B electrical architecture Then (Run/Crank or Accessory)	1  0  TRUE	2 failed auto- crank events out of 3 consecutive auto-crank events	

210BDG03D ECM Summary Tables

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

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Circuit High Voltage	P305B	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit high faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled  Run/Crank  Accessory  Battery Voltage	1  FALSE  TRUE  >= 6.60 Volts	320 failed samples out of 400 samples in 6.25 ms loop	Type B, 2 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Circuit Low Voltage	P305C	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit low faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled  Run/Crank  Accessory  Battery Voltage	1  TRUE  TRUE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  ECM Crank Control  Battery Voltage	1  0  TRUE  TRUE  FALSE  FALSE  >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)  ECM Crank Control  Battery Voltage	1  0  TRUE  TRUE  FALSE  TRUE  >= 6.60 Volts	24 failed samples out of 32 samples in 6.25 ms loop	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Speed Out of Range Low	P3071	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.	Pump Feedback Speed	<= -10.00 RPM	Diagnostic is Enabled  All of the following criteria are met for  12V System Voltage  PECR_MainCoolPmp SpdAct_Av PECR_MainCoolPmp SpdAct_Fol	>= 3.00 s  > 11.00 V (with hysteresis disable < 10.00 V)  = Not Active	4 seconds out of a 5 seconds window	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Speed Out of Range High	P3072	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	>= 6,280.00 RPM	Diagnostic is Enabled  All of the following criteria are met for  12V System Voltage  PECR_MainCoolPmp SpdAct_Av PECR_MainCoolPmp SpdAct_Fol	>= 3.00 s  > 11.00 V (with hysteresis disable < 10.00 V)  = Not Active	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Current Out of Range Low	P3073	<p>This diagnostic detects if the actual motor current is out of range low. If the enable criteria are met and the actual current 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.</p> <p>There are two different failure criteria depending on the pump commanded state (ON, OFF), however one time window is used to mature the diagnostic, and is not independent for each commanded state.</p>	Pump Motor AC Current	< 0.00 A	<p>Diagnostic is Enabled</p> <p>12V System Voltage</p> <p>PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol</p>	<p>&gt; 11.00 V (with hysteresis disable &lt; 10.00 V)</p> <p>= Not Active</p>	4 seconds out of a 5 seconds window	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Current Out of Range High	P3074	This diagnostic detects if the actual motor current is out of range high. If the enable criteria are met and the actual current 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 Motor AC Current	>= 80.00 A	Diagnostic is Enabled  12 System Voltage  PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol	> 11.00 V (with hysteresis disable < 10.00 V)          = Not Active	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump Low Current Performance	P3075	<p>The current performance diagnostic detects and reports failure of the pump or the cooling system flow. The diagnostic consists of an intrusive test performed each drive cycle if the necessary enable conditions are met and a passive test that runs continuously when the intrusive test is not executing. Only the intrusive test can report a diagnostic fail or pass result.</p> <p>Pump low current condition is when the actual electrical current is less than the expected electrical current for the reported pump speed. If the enable criteria are met, the intrusive test controls the pump to a calibratable speed for a calibratable time, during this time, if the actual current is less than the low current calibration failure threshold, the diagnostic reports a FAIL. If the actual current does not fall below the low current calibration failure threshold, the</p>	<p>Intrusive Test:</p> <p>Any of the following criteria is met</p> <p>Criteria 1:</p> <p><b>P3075 3076 Pump</b></p> <p>a) <b>Current Scaled</b> (A)</p> <p>b) EECR_EngineInlet_F A is Not Active</p> <p>Criteria 2:</p> <p>a) Pump Motor AC Current</p> <p>(See supporting tables for the above threshold values)</p> <p>The intrusive test runs at least once every drive cycle, but may be enabled again if the passive test has determined a potential failure after the intrusive diagnostic has passed.</p>	<p>&lt;</p> <p><b>P3075 Pump Low Current Performance Failure Threshold</b> (A)</p> <p>(See supporting tables for the above threshold values)</p>	<p>Diagnostic is Enabled</p> <p>12V System Voltage</p> <p>PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_FoFA PECR_MainCoolPmpSpd Act_Fol PECR_MainCoolPmpSpd Act_LcFA PECR_EMP_CurrOORL_ FA PECR_EMP_CurrOORH_ FA PECR_EMP_SpdBndI_FA PECR_EMP_CurrPerfLo_ TFTKO PECR_EMP_CurrPerfHi_ TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance _FA VECR_MRV_ActrFA EECR_EngineOutlet_FA</p> <p>Pump Enable</p> <p>Engine Block Valve Coolant Flow in Range</p> <p>Coolant Flow Restriction Factor in Range</p> <p>Pump Intrusive Test Timer</p> <p>Pump Speed Feedback in</p>	<p>&gt;= 10.20 V</p> <p>= Not Active</p> <p>= True</p> <p>20.00 to 100.00 %</p> <p>0.20 to 1.00</p> <p>&lt; 20.00 s</p>	4 seconds out of a 5 seconds window	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic reports a PASS.			<p>Range</p> <p>All of the following criteria are met for</p> <p>a) Coolant Distribution Mode (Criteria is met when the array table for the given distribution mode is TRUE)</p> <p>b) Coolant System Mode (Criteria is met when the array table for the given distribution mode is TRUE)</p> <p>Any of the following criteria is met for Criteria 1:</p> <p>a) Passive Test Result</p> <p>b) Desired Air Per Cylinder</p> <p>Criteria 2:</p> <p>a) Passive Test Result</p> <p>b) Desired Air Per Cylinder</p> <p>Any of the following criteria is met: Criteria 1:</p> <p>a)</p>	<p>3,800.00 RPM to 4,200.00 RPM</p> <p>&gt;= 2.00 s</p> <p><b>P3075 3076 Pump Current Performance Coolant Distribution =Mode</b> (1 is TRUE)</p> <p><b>P3075 3076 Pump Current Performance Coolant System Mode =Select</b> (1 is TRUE)</p> <p>&gt;= 2.00 s</p> <p>= Fail</p> <p>&gt; 120.00 mg (with hysteresis disable &lt; 100.00 mg)</p> <p>= Not Fail</p> <p>&gt; 120.00 mg (with hysteresis disable &lt; 100.00 mg)</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					PECR_EMP_CurrPerf Hi_TPTKO PECR_EMP_CurrPerf Lo_TPTKO  b) Pump Intrusive Test Attempts  Criteria 2: a) Passive Test Result  b) Pump Passive Requests  Any of the following criteria is met: a) Engine Outlet Coolant Temperature  b) OBD Coolant Enable	= Not Active  <= 3.00 Count  = Fail  <= 3.00 Count  >= 50.00 °C  = True		
			Passive Test:  Pump Motor AC Current   The passive test has fewer enable conditions than the intrusive, and is disabled while the intrusive test runs.  The passive test monitors the reported current at any given pump speed and flow restriction. Flow restriction is calculated	<= <b>P3075 Pump Low Current Passive Test Fail Threshold (A)</b>  (See supporting tables for the above threshold values)	Diagnostic is Enabled  12V System Voltage  PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_FoFA PECR_MainCoolPmpSpd Act_Fol PECR_MainCoolPmpSpd Act_LcFA PECR_EMP_CurrOORL_FA PECR_EMP_CurrOORH_FA	>= 10.20 V	4 seconds out of a 5 seconds window	

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			based on the current system valve configuration and pump speed. If the passive test determines a potential fault, then the intrusive test is re-enabled. All of the intrusive enable conditions must still be met prior to executing the intrusive test and making a diagnostic pass/fail decision.		PECR_EMP_SpdBndl_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA  Pump Enable  Pump Intrusive Test Override  Difference in Pump Command Speed from previous data sample to present data sample  Pump Speed Feedback in Range  Any of the following criteria is met: a) Engine Outlet Coolant Temperature b) OBD Coolant Enable	= Not Active  = True  = Not Active  < 50.00 RPM for >= 3.00 s  810.00 RPM to 6,180.00 RPM for >= 2.00 s  >= 50.00 °C  = True		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Pump High Current Performance	P3076	<p>The current performance diagnostic detects and reports failure of the pump or the cooling system flow. The diagnostic consists of an intrusive test performed each drive cycle if the necessary enable conditions are met and a passive test that runs continuously when the intrusive test is not executing. Only the intrusive test can report a diagnostic fail or pass result.</p> <p>Pump high current condition is when the actual electrical current is greater than the expected electrical current for the reported pump speed. If the enable criteria are met, the intrusive test controls the pump to a calibratable speed for a calibratable time, during this time, if the actual current is greater than the high current calibration failure threshold, the diagnostic reports a FAIL. If the actual current does not exceed the high current calibration failure threshold, the</p>	<p>Intrusive Test</p> <p>Any of the following criteria is met</p> <p>Criteria 1: <b>P3075 3076 Pump</b> a) <b>Current Scaled</b> (A)</p> <p>b) EECR_EngineInlet_F A is Not Active</p> <p>Criteria 2: a) Pump Motor AC Current</p> <p>(See supporting tables for the above threshold values)</p> <p>The intrusive test runs at least once every drive cycle, but may be enabled again if the passive test has determined a potential failure after the intrusive diagnostic has passed.</p>	<p>&gt; <b>P3076 Pump High Current Performance Failure Threshold</b> (A)</p> <p>(See supporting tables for the above threshold values)</p>	<p>Diagnostic is Enabled</p> <p>12V System Voltage</p> <p>PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_FoFA PECR_MainCoolPmpSpd Act_Fol PECR_MainCoolPmpSpd Act_LcFA PECR_EMP_CurrOORL_FA PECR_EMP_CurrOORH_FA PECR_EMP_SpdBndI_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA</p> <p>Pump Enable</p> <p>Engine Block Valve Coolant Flow in Range</p> <p>Coolant Flow Restriction Factor in Range</p> <p>Pump Intrusive Test Timer</p> <p>Pump Speed Feedback in</p>	<p>&gt;= 10.20 V</p> <p>= Not Active</p> <p>= True</p> <p>20.00 to 100.00 %</p> <p>0.20 to 1.00</p> <p>&lt; 20.00 s</p>	4 seconds out of a 5 seconds window	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic reports a PASS.			<p>Range</p> <p>All of the following criteria are met for</p> <p>a) Coolant Distribution Mode (Criteria is met when the array table for the given distribution mode is TRUE)</p> <p>b) Coolant System Mode (Criteria is met when the array table for the given distribution mode is TRUE)</p> <p>Any of the following criteria is met for Criteria 1:</p> <p>a) Passive Test Result</p> <p>b) Desired Air Per Cylinder</p> <p>Criteria 2:</p> <p>a) Passive Test Result</p> <p>b) Desired Air Per Cylinder</p> <p>Any of the following criteria is met:</p>	<p>3,800.00 RPM to 4,200.00 RPM</p> <p>&gt;= 2.00 s</p> <p><b>P3075 3076 Pump Current Performance Coolant Distribution =Mode (1 is TRUE)</b></p> <p><b>P3075 3076 Pump Current Performance Coolant System Mode =Select (1 is TRUE)</b></p> <p>&gt;= 2.00 s</p> <p>= Fail</p> <p>&gt; 120.00 mg (with hysteresis disable &lt; 100.00 mg)</p> <p>= Not Fail</p> <p>&gt; 120.00 mg (with hysteresis disable &lt; 100.00 mg)</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Criteria 1: a) PECR_EMP_CurrPerf Hi_TPTKO PECR_EMP_CurrPerf Lo_TPTKO  b) Pump Intrusive Test Attempts  Criteria 2: a) Passive Test Result  b) Pump Passive Requests  Any of the following criteria is met: a) Engine Outlet Coolant Temperature  b) OBD Coolant Enable	= Not Active  <= 3.00 Count  = Fail  <= 3.00 Count  >= 50.00 °C  = True		
			Passive Test:  Pump Motor AC Current   The passive test has fewer enable conditions than the intrusive, and is disabled while the intrusive test runs.  The passive test monitors the reported current at any given pump speed	>= <b>P3076 Pump High Current Passive Test Fail Threshold</b> (A)  (See supporting tables for the above threshold values)	Diagnostic is Enabled  12V System Voltage  PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_Fol PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_FoFA PECR_MainCoolPmpSpd Act_Fol PECR_MainCoolPmpSpd Act_LcFA PECR_EMP_CurrOORL_FA	>= 10.20 V	4 seconds out of a 5 seconds window	

## 21OBDG03D ECM Summary Tables

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## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 4 Control Circuit Open	P3080	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 4 Control Circuit Low Voltage	P3081	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 4 Control Circuit High Voltage	P3082	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 4 Performance	P3083	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 4	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 4 Pin Stuck	P3084	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 4 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 5 Control Circuit Open	P3085	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 5 Control Circuit Low Voltage	P3086	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 5 Control Circuit High Voltage	P3087	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 5 Performance	P3088	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 5	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips



# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 5 Pin Stuck	P3089	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 5 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 6 Control Circuit Open	P308A	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 6 Control Circuit Low Voltage	P308B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 6 Control Circuit High Voltage	P308C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 6 Performance	P308D	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 6	Detected an Unintended pin firing wliouth controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 6 Pin Stuck	P308E	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 6 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 7 Control Circuit Open	P308F	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 7 Control Circuit Low Voltage	P3090	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 7 Control Circuit High Voltage	P3091	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 7 Performance	P3092	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 7	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 7 Pin Stuck	P3093	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 7 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 8 Control Circuit Open	P3094	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 8 Control Circuit Low Voltage	P3095	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 8 Control Circuit High Voltage	P3096	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	$\leq 0.5 \Omega$ impedance between signal and controller power	<p>Diagnostic is Enabled</p> <p>System supply</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 8 Performance	P3097	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 8	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Profile Actuator 8 Pin Stuck	P3098	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 8 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )  If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00 , but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 4 Circuit Open	P3099	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnosis is Enabled  System supply voltage  Ignition switch is in crank or run position	> 11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 4 Circuit Low Voltage	P309A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 4 Circuit High Voltage	P309B	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 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.  Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00  fails out of 5.00  samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Profile Actuator 4 Performance	P309C	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 4	Detected an Unintended pin firing without controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )  If actuator below 55.00 threshold without command	Diagnostic is Enabled  system voltage  engine running	> 11.00 Volts  = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor D Circuit Bank 1	P30B0	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor D Range/ Performance Bank 1	P30B1	Intake Hall Sensor 4 position feedback not matching expected	<p>DTC detects shift Pin Position Hall feedback</p> <p>If Hall Feedback signal seen but no shift command was sent to actuator.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED(Pin returned to home position 68.00 )</p>	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	<p>Diagnostic is Enabled</p> <p>System Voltage</p> <p>Engine Running</p> <p>No Active P Codes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO</p>	4.00 samples out of 5.00 reading	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor D Circuit Low Bank 1	P30B2	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D solenoid 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq 0.5 \Omega$ impedance between signal and controller ground	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position	> 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Actuator Position Sensor D Circuit High Bank 1	P30B3	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	$\leq 0.5 \Omega$ impedance between signal and controller power	Diagnostic is Enabled  System supply  Output driver is commanded off  Ignition switch is in crank or run position	> 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve Position Sensor A Circuit Bank 1	P30BE	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position  No P Codes active	> 11.00 Volts      CamSensorAnyLctnTFTKO CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve Position Sensor A Range/ Performance Bank 1	P30BF	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals. Intake sensor 1	<p>First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods.</p> <p>The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS</p> <p>0 edges per engine cycle with signal low = Short to Ground or Open</p> <p>OR</p> <p>0 edges per engine cycle with signal High = Short to Power</p> <p>OR (2nd SECTION)</p> <p>Failed lift state change attempt signal sequence.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position</p>	<p>number of edges read this engine cycle &lt;&gt; 2.00</p> <p>Buffer reading low signals</p> <p>Buffer reading High signals</p> <p>System feed back has reported less than all of the following: EXTENDING (below 55.00 ), EXTENDED (below 45.00 ) RETRACTED (above 68.00 ), and the barrel</p>	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine running</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO CrankSensor_TFTKO</p>	16.00 fails out of 20.00 samples	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			68.00 )  We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	position sensor identifying that the lift state has changed.  Observation window.  Not missing EXTENDED reading: 30.00 events  Missing the EXTENDED reading: 20.00 events				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve Position Sensor B Circuit Bank 1	P30C2	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position  No P Codes active	> 11.00 Volts    CamSensorAnyLctnTFTKO CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve Position Sensor B Range/ Performance Bank 1	P30C3	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Intake 2	<p>First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS</p> <p>0 edges per engine cycle with signal low = Short to Ground or Open</p> <p>OR</p> <p>0 edges per engine cycle with signal High = Short to Power</p> <p>OR (2nd SECTION)</p> <p>Failed lift state change attempt signal sequence.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )</p>	<p>number of edges read this engine cycle &lt;&gt; 2.00</p> <p>Buffer reading low signals</p> <p>Buffer reading High signals</p> <p>System feed back has reported less than all of the following: EXTENDING (below 55.00 ), EXTENDED (below 45.00 ) RETRACTED (above 68.00 ), and the barrel position sensor identifying that the lift state has changed.</p>	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine running</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO CrankSensor_TFTKO</p>	16.00 fails out of 20.00 samples	Type A, 1 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Observation window.  Not missing EXTENDED reading: 30.00 events  Missing the EXTENDED reading: 20.00 events				

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve Position Sensor A Circuit Bank 1	P30C6	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Position Sensor A 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run position  No P Codes active	> 11.00 Volts    CamSensorAnyLctnTFTKO CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve Position Sensor A Range/ Performance Bank 1	P30C7	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Exhaust 1	<p>First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS</p> <p>0 edges per engine cycle with signal low = Short to Ground or Open</p> <p>OR</p> <p>0 edges per engine cycle with signal High = Short to Power</p> <p>OR (2nd SECTION)</p> <p>Failed lift state change attempt signal sequence.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )</p>	<p>number of edges read this engine cycle &lt;&gt; 2.00</p> <p>Buffer reading low signals</p> <p>Buffer reading High signals</p> <p>System feed back has reported less than all of the following: EXTENDING (below 55.00 ), EXTENDED (below 45.00 ) RETRACTED (above 68.00 ), and the barrel position sensor identifying that the lift state has changed.</p>	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine running</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO CrankSensor_TFTKO</p>	16.00 fails out of 20.00 samples	Type A, 1 Trips



21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Observation window.  Not missing EXTENDED reading: 30.00 events  Missing the EXTENDED reading: 20.00 events				

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve Position Sensor B Circuit Bank 1	P30CA	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Position Sensor B 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. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground.	Diagnostic is Enabled  System supply voltage  Output driver is commanded on  Ignition switch is in crank or run positionsystem voltage  No P Codes active	> 11.00 Volts      CamSensorAnyLctnTFTKO CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve Position Sensor B Range/ Performance Bank 1	P30CB	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Exhaust 2	<p>First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS</p> <p>0 edges per engine cycle with signal low = Short to Ground or Open</p> <p>OR</p> <p>0 edges per engine cycle with signal High = Short to Power</p> <p>OR (2nd SECTION)</p> <p>Failed lift state change attempt signal sequence.</p> <p>System measures 3 states for each shift, EXTENDING (Pin started firing 55.00 ), EXTENDED (Pin completely fired 45.00 ), RETRACTED (Pin returned to home position 68.00 )</p> <p>We expect to see all 3</p>	<p>number of edges read this engine cycle &lt;&gt; 2.00</p> <p>Buffer reading low signals</p> <p>Buffer reading High signals</p> <p>System feed back has reported less than all of the following: EXTENDING (below 55.00 ), EXTENDED (below 45.00 ) RETRACTED (above 68.00 ), and the barrel position sensor identifying that the lift state has changed.</p> <p>Observation window.</p>	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine running</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO O CrankSensor_TFTKO</p>	16.00 fails out of 20.00 samples	Type A, 1 Trips

21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Not missing EXTENDED reading: 30.00 events  Missing the EXTENDED reading: 20.00 events				

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve "A" Alignment	P30CE	The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	<p>The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.</p> <p>Sleeve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.</p>	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered.	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine run state</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO</p> <p>CrankSensor_TFTKO</p>	3.00 reading out of 200.00 samples	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"A" Camshaft Profile Control Sleeve "B" Alignment	P30CF	The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	<p>The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.</p> <p>Sleeve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.</p>	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine run state</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO</p> <p>CrankSensor_TFTKO</p>	3.00 reading out of 200.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve "A" Alignment	P30D0	The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	<p>The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.</p> <p>Sleeve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.</p>	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine run state</p> <p>No active Pcodes</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO</p> <p>CrankSensor_TFTKO</p>	3.00 reading out of 200.00 samples	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
"B" Camshaft Profile Control Sleeve "B" Alignment	P30D1	The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	<p>The system monitors the Sliding Cam Control Sleeve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.</p> <p>Sleeve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.</p>	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	<p>Diagnostic is Enabled</p> <p>system voltage</p> <p>engine run state</p> <p>No P codes active</p>	<p>&gt; 11.00 Volts</p> <p>= TRUE</p> <p>CamSensorAnyLctnTFTKO O CrankSensor_TFTKO</p>	3.00 reading out of 200.00 samples	Type A, 1 Trips



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude</b> (See supporting table)</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude</b> (See supporting table)</p> <p>=&lt;</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time</b> (See supporting table)</p> <p>&gt;=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>&gt;=</p> <p><b>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</b></p>	<p>2.50 Second Fail count out of 10.00 seconds Samples</p> <p>Continuous</p>	Type B, 2 Trips

21OBDG03D ECM Summary Tables

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

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 3	P30D8	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 4	P30D9	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 5	P30DA	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 6	P30DB	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 7	P30DC	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 8	P30DD	This DTC detects intermittent 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  12.5 ms /count in the ECM main processor	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  b] Configuration calibration for number of fans  c] Diagnostic System Disabled  d] Battery Voltage In Range  e] LIN Bus based Fan Operation Enabled  f] LIN Serial data Lost communication Fault Active  g] LIN Serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0]  b] >= 1 unit  c] <> True  d] > 11.00 volts  e] == TRUE  f] <> True  g] <> True	16.00 failures out of 20.00 samples;  1000 ms / sample	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  b] Configuration calibration for number of fans  c] Diagnostic System Disabled  d] Battery Voltage In Range  e] LIN Bus based Fan Operation Enabled  f] LIN Bus Lost Communication Fault Active  g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0]  b] >= 1 unit  c] <> True  d] > 11.00 volts  e] == TRUE  f] <> True  g] <> True	16.00 failures out of 20.00 samples;  1000 ms / sample	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake System Vehicle Speed Limit Request Signal Message Counter Incorrect	P314F	This DTC monitors for an error in communication with the Brake System Vehicle Speed Limit Request Signal.	<p>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:</p> <p>Braking System Vehicle Top Speed Limit Request Type ARC</p> <p>Braking System Vehicle Top Speed Limit Request Type PV</p>	<p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p> <p>&gt;= 3.00 counts out of &gt;= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>&gt;= 3,000.00 milliseconds</p> <p>&gt;= 11.00 volts</p> <p>&lt;= 18.00 volts</p>	Executes in 12.5ms loop.	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

[illegible]

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled  >= 11.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds  before the sample time of is reached	5 counts (equivalent to 812.51 milliseconds)  812.51 milliseconds	General Enable Criteria:  Starter motor engaged for Or Run/Crank ignition voltage  All below criteria have been met for  CAN channel is requesting full communications  Normal CAN transmission on Bus is enabled  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage  Controller type: 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	> 15,000.00 milliseconds  > 8.41 Volts  >= 3,000.00 milliseconds          > 11.00 Volts          ≤ 18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled    >= 11.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds  before the sample time of is reached	5 counts (equivalent to 812.51 milliseconds)  812.51 milliseconds	General Enable Criteria:  Starter motor engaged for Or Run/Crank ignition voltage  All below criteria have been met for  CAN channel is requesting full communications  Normal CAN transmission on Bus is enabled  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage  Controller type: 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	> 15,000.00 milliseconds  > 8.41 Volts  >= 3,000.00 milliseconds          > 11.00 Volts          ≤ 18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled  >= 11.00 Volts		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	<p>Message is not received from controller for</p> <p>Message \$0C7:</p> <p>Message \$0F9:</p> <p>Message \$189:</p> <p>Message \$197:</p> <p>Message \$19D:</p> <p>Message \$1A6:</p> <p>Message \$1AF:</p> <p>Message \$1F5:</p> <p>Message \$4C9:</p>	<p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	<p>Message is not received from controller for</p> <p>Message \$2CB</p> <p>Message \$2CD</p>	<p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissio ns Neutral Diagnost ics – Type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Brake System Control Module	U0129	Detects that CAN serial data communication has been lost with the EBCM Transmission Control Module on GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted.  One or more of the messages \$0C1, \$214, \$22A, \$500 :	=Undetected.	Controller On:  Ignition:  OBD Control Modules, e.g. ECM: Accessory Wake Up:  Virtual Network condition:  Bus off DTC U0073  U0129_00_ENABLE=  The enabling calibration must be set to 5 to enable a type A DTC:	=True  = Run or Crank or Accessory  Active  Any Virtual Network that the module participates in is active.  Not fault active  Enabled  5.00	Frame \$0C1: 1 sec  Frame \$214: 10 sec  Frame \$22A: 1 sec  Frame \$500: 10 sec	Type A, one trip



## 21OBDG03D ECM Summary Tables

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# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	<p>Message is not received from controller for</p> <p>Message \$0F1</p> <p>Message \$1E1</p> <p>Message \$1F1</p> <p>Message \$451</p>	<p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p> <p>≥ 500.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissio ns Neutral Diagnost ics – Type C"

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A.	<p>Message is not received from controller for</p> <p>Message \$3CF</p> <p>Message \$4D4</p>	<p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on the LIN bus.	<p>Message is not received from device for</p> <p>IBSAmpHourChg_18_C02</p> <p>IBSAmpHourDisChrg_19_C02</p> <p>IBSCalcData_16_C02</p> <p>IBSCfgDataRtn_1E_C02</p> <p>IBSCurrentFOMData_1A_C02</p> <p>IBSFOMData_1C_C02</p> <p>IBSMasuredTemp_17_C02</p> <p>IBSMVIData_15_C02</p> <p>IBSVehStartData_1D_C02</p> <p>IBSVoltageFOMData_1B_C02</p>	<p>&gt;= 1,250.00 milliseconds</p> <p>&gt;= 1,250.00 milliseconds</p> <p>&gt;= 1,250.00 milliseconds</p> <p>&gt;= 2,500.00 milliseconds</p> <p>&gt;= 5,000.00 milliseconds</p> <p>&gt;= 5,000.00 milliseconds</p> <p>&gt;= 625.00 milliseconds</p> <p>&gt;= 625.00 milliseconds</p> <p>&gt;= 2,506.25 milliseconds</p> <p>&gt;= 5,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>Slave is calibrated as present</p> <p>All below criteria have been met for</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition</p>	<p>Enabled</p> <p>Enabled</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p> <p>&gt;= 11.00 Volts</p>	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled  >= 11.00 Volts		



## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus with Shutter Module A.	<p>Message is not received from device for</p> <p>ACM1Rsp_31_C02</p>	>= 1,250.00 milliseconds	<p>General Enable Criteria:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>Slave is calibrated as present</p> <p>Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled</p> <p>All below criteria have been met for</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never</p>	<p>Enabled</p> <p>Enabled</p> <p>Enabled</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Disabled  Low voltage disable mode: OBDII  If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts   >= 9.00 Volts   > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled      >= 11.00 Volts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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. 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. 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  OR  Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol  OR  Message Pulse < Message Pulse >  OR  Message Age Limit >=  OR  Signal CRC fails	0.5 V   OR  4.1 V   OR  0.125977 ms 0.209991 ms  OR  3.125 ms	Run/Crank voltage	> 6.41 Volts	79 / 159 counts;  57 counts continuous;  3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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. 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. 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  OR  Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol  OR  Message Pulse < Message Pulse >  OR  Message Age Limit >=  OR  Signal CRC fails	0.5 V  OR  4.1 V  OR  0.125977 ms 0.209991 ms  OR  3.125 ms	Run/Crank voltage	> 6.41 Volts	79 / 159 counts;  57 counts continuous;  3.125 ms /count in the ECM main processor	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Mass or Volume Air Flow Sensor A	U060F	This DTC monitors for a loss of communication on the LIN bus with Mass or Volume Air Flow Sensor A.	Message is not received from device for  MAF_Rsp_Press_2B_C0 3  MAF_Rsp_TmpHum_2A_ C03	 >= 75.00 milliseconds   >= 250.00 milliseconds	General Enable Criteria:  Diagnostic is enabled  LIN channel is enabled  LIN module is initialized  Slave is calibrated as present  All below criteria have been met for  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage  Controller type: 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  If OBDII: Run/Crank ignition	 Enabled  Enabled     >= 3,000.00 milliseconds   > 11.00 Volts   <= 18.00 Volts         >= 11.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled      >= 11.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Engine Coolant Bypass Valve C	U0617	Communication Check This DTC will detect if SENT communication was lost for the Engine Coolant Bypass Valve C Sensor	<p>If any of the following conditions are met a failure count will be recorded:</p> <p><b>Condition 1:</b> HWIO message faults</p> <p><b>Condition 2:</b> Pulse count delta AND Message age</p> <p><b>Condition 3:</b> Voltage on SENT pin is greater than a controller specific threshold AND Message age</p> <p><b>Condition 4:</b> Voltage on SENT pin is less than a controller specific threshold AND Message age</p>	<p>= No Fault</p> <p>&gt;0</p> <p>&gt; 6.25 ms</p> <p>&gt; 6.25 ms</p> <p>&gt; 6.25 ms</p>	<p>Diagnostic is Enabled</p> <p>Run Crank Ignition in Range</p> <p>Engine not cranking</p> <p>Engine Diag System</p>	<p>= True</p> <p>= True</p> <p>= Enabled</p>	4 seconds out of a 5 seconds window	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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  SENT Signal Line State	<= 40  = Low	SENT Sensor Communication Circuit Diagnostic Enabled  SENT power up delay	True  >= 0.00 seconds  Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples  6.25 ms per sample Continuous	Type A, 1 Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 LIN Communication Failure	U0632	This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.	Message is not received from device for  CFM1_Rsp_2D_C02	  >= 2,500.00 milliseconds	General Enable Criteria:  Diagnostic is enabled  LIN channel is enabled  LIN module is initialized  Slave is calibrated as present  Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for  All below criteria have been met for  Accessory mode to off mode not pending  Battery voltage  Controller is an OBD controller Or Battery Voltage  Controller type: OBD Controller  If power mode = Run/ Crank:  Power Mode is run  If calibratable low voltage	Enabled  Enabled        >= 1.00 seconds  >= 3,000.00 milliseconds    > 11.00 Volts   <= 18.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds</p> <p>&gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of communication with wastegate position sensor "A"	U0644	Detects a continuous communication fault on the eWG "A" SENT interface. The diagnostic monitors the SENT message in respect to message pulses and timing validity. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	SENT Mesage Faults  SENT Mesage age	> 0 cnt  > 3.13 ms	Diagnostic enabled and Sent Interface used ***** Powertrain relay voltage ***** Engine does not crank Diagnostic system not disabled	True  True ***** >= 11.0 Volts *****	10 failures out of 12 samples  100ms / sample	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Fuel Temperature Sensor A	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  SENT Signal Line State	<= 40  = High	SENT Sensor Communication Circuit Diagnostic Enabled  SENT power up delay	True  >= 0.00 seconds  Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples  6.25 ms per sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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  SENT Signal Line State	<= 40  = High	SENT Sensor Communication Circuit Diagnostic Enabled  SENT power up delay	True  >= 0.00 seconds  Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples  6.25 ms per sample Continuous	Type A, 1 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Engine Coolant Pump	U0672	This DTC monitors for a loss of communication on the LIN bus with the Engine Coolant Pump	Message is not received from controller for  MWP_Rsp_0F_C05	  >= 250.00 milliseconds	General Enable Criteria:  Diagnostic is enabled  LIN channel is enabled  LIN module is initialized Slave is calibrated as present  Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled  All below criteria have been met for  Accessory mode to off mode not pending  Battery voltage  Controller is an OBD controller Or Battery Voltage  Controller type: OBD Controller  If power mode = Run/ Crank:  Power Mode is run If calibratable low voltage disable mode is not Never Disabled  Low voltage disable	Enabled  Enabled     Enabled  >= 3,000.00 milliseconds  > 11.00 Volts    <= 18.00 Volts	LIN bus communication executes in 500ms loop	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mode: OBDII  If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled      >= 11.00 Volts		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Zone Module Configuration 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 OR = Not Configured Index Value [device failed to accept calibration value on 1st wake-up]	a) Diagnostic enabled; b) Device feedback Faulted; c) Diagnostic system disabled; d) CAN serial data message \$3C8 received	a) = 1.00 [1=TRUE; 0 <> True] b) <> True; c) <> True; d) = TRUE	6.00 failures of 8.00 samples ; 100 millisec / sample	Type B, 2 Trips



21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		DTC is set.						

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Fuel Rail Pressure Sensor Bank1 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  SENT Signal Line State	<= 40  = High	SENT Sensor Communication Circuit Diagnostic Enabled  SENT power up delay	True  >= 0.00 seconds  Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples  6.25 ms per sample Continuous	Type A, 1 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Engine Coolant Bypass Valve D	U111A	This DTC monitors for a loss of communication on the LIN bus with Engine Coolant Bypass Valve D	Message is not received from controller for  BRV_Rsp_29_C05	  >= 250.00 milliseconds	General Enable Criteria:  Diagnostic is enabled  LIN channel is enabled  LIN module is initialized Slave is calibrated as present  Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled  All below criteria have been met for  Accessory mode to off mode not pending  Battery voltage  Controller is an OBD controller Or Battery Voltage  Controller type: OBD Controller  If power mode = Run/ Crank:  Power Mode is run If calibratable low voltage disable mode is not Never Disabled  Low voltage disable	Enabled  Enabled     Enabled  >= 3,000.00 milliseconds   > 11.00 Volts    <= 18.00 Volts	LIN bus communication executes in 500ms loop	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mode: OBDII  If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled    >= 11.00 Volts		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with EVAP Purge Pump	U111E	This DTC monitors for a loss of communication on the LIN bus with the EVAP Purge Pump	Message is not received from controller for  EVAPP_Rsp_01_C05	  >= 250.00 milliseconds	General Enable Criteria:  Diagnostic is enabled  LIN channel is enabled  LIN module is initialized Slave is calibrated as present  Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled  All below criteria have been met for  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage  Controller type: OBD Controller  If power mode = Run/ Crank:  Power Mode is run If calibratable low voltage disable mode is not Never Disabled  Low voltage disable	Enabled  Enabled     Enabled  >= 3,000.00 milliseconds  > 11.00 Volts    <= 18.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mode: OBDII  If OBDII: Run/Crank ignition voltage  If EOBD: Run/Crank ignition voltage  If Secure: Starter motor engaged for Or Run/Crank ignition voltage  If Hybrid Secure: Run/Crank ignition voltage  If power mode = Accessory:  Off key cycle diagnostics are enabled Or Controller is an OBD controller  Controller shutdown is not impending  Power Mode is not run/ crank  Battery voltage	>= 11.00 Volts  >= 9.00 Volts  > 15,000.00 milliseconds > 8.41 Volts  >= 6.41 Volts  Enabled    >= 11.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1.	<p>Loss of Communication Method:</p> <p>The total number of diagnostic enabled slave nodes on LIN Bus 1</p> <p>Or</p> <p>LIN channel Wakeup Method:</p> <p>LIN channel wakeup repetition counter</p>	<p>= Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs</p> <p>&gt;= 10.00 counts</p>	<p>Loss of Communication Method:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>The following criteria have been enabled for:</p> <p>LIN channel is requesting full communications</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII:</p>	<p>Enabled</p> <p>Enabled</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Dependent on bus loading.	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds  > 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	Enabled		
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					LIN channel is requesting full communications  LIN module is initialized  The following criteria have been enabled for:  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage	>= 3,000.00 milliseconds          > 11.00 Volts          <= 18.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	<p>Loss of Communication Method:</p> <p>The total number of diagnostic enabled slave nodes on LIN Bus 2</p> <p>Or</p> <p>LIN channel Wakeup Method:</p> <p>LIN channel wakeup repetition counter</p>	<p>= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs</p> <p>&gt;= 10.00 counts</p>	<p>Loss of Communication Method:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>The following criteria have been enabled for:</p> <p>LIN channel is requesting full communications</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII:</p>	<p>Enabled</p> <p>Enabled</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Dependent on bus loading.	Type A, 1 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds  > 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	Enabled		
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting			

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					full communications  LIN module is initialized  The following criteria have been enabled for:  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage	>= 3,000.00 milliseconds          > 11.00 Volts          <= 18.00 Volts		

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 4	U1348	This DTC monitors for a LIN bus 4 off condition.	<p>Loss of Communication Method:</p> <p>The total number of diagnostic enabled slave nodes on LIN Bus 4</p> <p>Or</p> <p>LIN channel Wakeup Method:</p> <p>LIN channel wakeup repetition counter</p>	<p>= Total number of slave nodes on LIN Bus 4 that have reported lost communications DTCs</p> <p>&gt;= 10.00 counts</p>	<p>Loss of Communication Method:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>The following criteria have been enabled for:</p> <p>LIN channel is requesting full communications</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller</p> <p>Or</p> <p>Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII:</p>	<p>Enabled</p> <p>Enabled</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Dependent on bus loading.	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds  > 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	Enabled		
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>= 11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting			

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					full communications  LIN module is initialized  The following criteria have been enabled for:  Accessory mode to off mode not pending  Battery voltage  Conroller is an OBD controller Or Battery Voltage	>= 3,000.00 milliseconds          > 11.00 Volts          <= 18.00 Volts		

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	U135E	This DTC monitors for a loss of communication on the LIN bus with Transmission Control Module.	<p>Message is not received from device for</p> <p>Global A: TCM_Rsp_01_C02</p>	>= 150.00 milliseconds	<p>General Enable Criteria:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>Slave is calibrated as present</p> <p>Power mode is run/crank or accessory Or Module is not shutting down And TRCM master is not timed out And If monitor timeout is enabled Monitor has not timed out for</p> <p>All below criteria have been met for</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p>	<p>Enabled</p> <p>Enabled</p> <p>Enabled</p> <p>&gt;= 600.00 seconds</p> <p>&gt;= 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	LIN bus communication executes in 500ms loop.	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds</p> <p>&gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p>		

210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode is not run/ crank  Battery voltage	  >= 11.00 Volts		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Fuel Pump Driver Control Module on Bus S	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus S.	<p>Message is not received from controller for</p> <p>Message \$0C3</p> <p>Message \$0C4</p> <p>Message \$0CB</p> <p>Message \$0CC</p> <p>Message \$1E6</p> <p>Message \$2C1</p> <p>Message \$2D7</p> <p>Message \$2D9</p> <p>Message \$3EC</p> <p>Message \$3EE</p>	<p>≥ 10,000.00 milliseconds</p> <p>≥ 4,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 1,131.25 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 210BDG03D ECM Summary Tables

[illegible]

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Lost Commu- nication 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  Ignition   The DTC type must be set to 6 to enable a type B DTC:	11V < RC Volt < 32V  = Run/Crank  OR  = Accessory  6.00	1.0 second	DTC Type B, Two Trips

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Transmissio n 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.	<p>Message is not received from controller for</p> <p>Message \$1E4</p> <p>Message \$1EC</p> <p>Message \$2F3</p> <p>Message \$4C4</p>	<p>≥ 1,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p> <p>≥ 1,000.00 milliseconds</p> <p>≥ 10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>≥ 3,000.00 milliseconds</p> <p>&gt; 11.00 Volts</p> <p>&lt;= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips



# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

# 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Message is not received from controller for</p> <p>Message \$2C2</p> <p>Message \$2EC</p>	<p><math>\geq 1,000.00</math> milliseconds</p> <p><math>\geq 10,000.00</math> milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p><math>\geq 3,000.00</math> milliseconds</p> <p><math>&gt; 11.00</math> Volts</p> <p><math>\leq 18.00</math> Volts</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/ crank</p> <p>Battery voltage</p>	<p>&gt;= 11.00 Volts</p> <p>&gt;= 9.00 Volts</p> <p>&gt; 15,000.00 milliseconds &gt; 8.41 Volts</p> <p>&gt;= 6.41 Volts</p> <p>Enabled</p> <p>&gt;= 11.00 Volts</p>		

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communicati on with ECM	U18D5	This DTC monitors for a CGM Lost Communication with ECM error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Lost Communication with ECM DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module  ECM	  is being received  is present on the bus  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

# 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communicati on with TCM	U18D7	This DTC monitors for a CGM Lost Communication with TCM error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Lost Communication with TCM DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module  TCM	  is being received  is present on the bus  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communication with BSCM1	U18DC	This DTC monitors for a CGM Lost Communication with BSCM1 error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the CGM Lost Communication with BSCM1 DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module  BSCM1	is being received  is present on the bus  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	U240D	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Expansion Bus Status	= off	Ignition  The enabling calibration must be set to 6 to enable a type B DTC:	= Run or Run/Crank  6.00	1 second	DTC Type B, Two Trips

## 210BDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Selector Control Module Powertrain Sensor CAN Bus Off	U240E	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Sensor Bus Status	=off	Ignition=  The enabling calibration must be set to 6 to enable a type B DTC:	Run or Run/Crank  6.00	1 second	DTC Type B, Two Trips



## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	The CGM Diagnostic Status Message signal in GMLAN frame \$3CF indicates that the Central Gateway Module High Speed CAN Bus Off DTC has set in the CGM.		General Enable Criteria:  Message \$3CF  Central Gateway Module	  is being received  is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

## 21OBDG03D ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 $\neq$ Range Command	Diagnostic Enable Calibration  Recent Range Command Transition  TCM LIN Node or Bus Fault Active  The enabling calibration must be set to 6 to enable a type B DTC:	= TRUE  = FALSE  = FALSE  6.00	80 failures out of 100 samples 50 ms loop	DTC Type B, Two Trips

### Initial Supporting table - Maximum number of iterations allowed for torque solver

**Description:** Maximum number of iterations allowed for torque solver versus controller identifier name

**Value Units:** Number of iterations allowed

**X Unit:** Controller identifier enumeration name.

**Y Units:** Number of iterations allowed, integer values.

#### Maximum number of iterations allowed for torque solver - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	30	30	30	30	30	15	30	30	30	30	30	30	30	30	30	30	30	30	30	15	30	15	30

#### Maximum number of iterations allowed for torque solver - Part 2

y/x	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
1	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	

## Initial Supporting table - P0128 Maximum Acculated Energy - Primary

**Description:** KtETHD\_E\_EOR\_WrmUpEnrgyLimTest0

**Value Units:** Cooling system energy failure threshold (kJ)

**X Unit:** Minimum ECT for the key cycle (°C)

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0
1.0	35,000.0	29,000.0	23,500.0	19,000.0	15,500.0	13,000.0	11,000.0

## Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

**Description:** KtETHD\_E\_EOR\_WrmUpEnrgyLimTest1

**Value Units:** Cooling system energy failure threshold (kJ)

**X Unit:** Minimum ECT for the key cycle (°C)

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0
1.0	35,000.0	29,000.0	23,500.0	19,000.0	15,500.0	13,000.0	11,000.0

## Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

**Description:** KtETHD\_E\_EOR\_WrmUpEnrgyLimTest2

**Value Units:** Cooling system energy failure threshold (kJ)

**X Unit:** Minimum ECT for the key cycle (°C)

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0
1.0	35,000.0	29,000.0	23,500.0	19,000.0	15,500.0	13,000.0	11,000.0

## Initial Supporting table - P01F0 - 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	0.00	0.25	0.50	0.67	1.00
-9.0	28.0	28.0	28.0	28.0	28.0
0.0	28.0	28.0	28.0	28.0	28.0
10.0	20.0	20.0	20.0	20.0	20.0
20.0	15.0	15.0	15.0	15.0	15.0
40.0	15.0	15.0	15.0	15.0	15.0

Initial Supporting table - P0234 P0299: Desired torque minimum limit overAmbient pressure to enable the WG deviation diagnosis.

**Description:** Desired torque minimum limit overAmbient pressure to enable the WG deviation diagnosis.

**Value Units:** [M] Engine torque threshold  
**X Unit:** [p] KnBSTD\_p\_WG\_DevAmbAirPresBP - Ambient pressure

y/x	60	80	100
1	220	230	240



**Initial Supporting table - P0234 P0299: Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis.****Description:** Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis.**Value Units:** [rpm] Engine speed threshold**X Unit:** [p] KnBSTD\_p\_WG\_DevAmbAirPresBP - Ambient pressure

y/x	60	80	100
1	2,000	1,750	1,500

Supporting table - P0234 P0299: Wastegate position deviation diagnostic enable delay as a function of engine speed and ambient pressure

<b>Description:</b> Timer to stabilize enable conditions for wastegate position deviation diagnosis.							
<b>Value Units:</b> [sec] Pressure control deviation diagnosis enable delay. <b>X Unit:</b> [rpm] KnBSTD_n_WG_DevEngSpdBP - Engine Speed <b>Y Units:</b> [kPa] KnBSTD_p_WG_DevAmbAirPresBP - Ambient Pressure							
y/x	1,500	2,300	3,100	3,900	4,700	5,500	6,300
60	2	1	1	1	1	1	1
80	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1

## Initial Supporting table - P0299: Additive offset on WG negative deviation ambient correction.

**Description:** Additive offset on WG negative deviation ambient correction.

**Value Units:** [Pct] Position deviation ambient correction

**X Unit:** [kPa] KnBSTD\_p\_WG\_DevAmbAirPresBP - Ambient Air Pressure

**Y Units:** [rpm] KnBSTD\_n\_WG\_DevEngSpdBP - Engine Speed

y/x	60.0	80.0	100.0
1,500.0	0.0	0.0	0.0
2,300.0	0.0	0.0	0.0
3,100.0	0.0	0.0	0.0
3,900.0	0.0	0.0	0.0
4,700.0	0.0	0.0	0.0
5,500.0	0.0	0.0	0.0
6,300.0	0.0	0.0	0.0

**Initial Supporting table - P0299: WG negative deviation fail threshold over engine speed and desired torque.**
**Description:** WG negative deviation fail threshold over engine speed and desired torque.

**Value Units:** [Pct] Position deviation threshold

**X Unit:** [M] KnBSTD\_M\_WG\_DevDsrdTrqBP - Desired Torque

**Y Units:** [rpm] KnBSTD\_n\_WG\_DevEngSpdBP - Engine Speed

y/x	220	250	280	310	340	370
1,500	-20	-19	-19	-18	-18	-18
2,300	-19	-19	-18	-18	-17	-17
3,100	-19	-18	-18	-18	-17	-17
3,900	-19	-18	-18	-18	-17	-17
4,700	-19	-18	-18	-18	-17	-17
5,500	-18	-17	-17	-17	-17	-17
6,300	-18	-17	-17	-17	-17	-17

**Initial Supporting table - P0446 canister vent restriction test displaced purge volume limit****Description:** Canister vent restriction diagnostic displaced purge volume (liters) as a function of barometric pressure (kPa)**Value Units:** Displaced purge volume (Liters)**X Unit:** Barometric pressure (kPa)

y/x	70	80	90	100	110
1	10.0	10.0	10.0	10.0	10.0

**Initial Supporting table - P0446 canister vent restriction test tank vacuum threshold****Description:** Canister vent restriction diagnostic vacuum failure threshold (Pa) as a function of barometric pressure (kPa)**Value Units:** Vacuum (Pa)**X Unit:** Barometric pressure (kPa) - 70, 80, 90, 100, 110 kPa

y/x	1	2	3	4	5
1	3,000	3,000	3,000	3,000	3,000

**Initial Supporting table - P0455 large leak diagnostic displaced purge volume threshold****Description:** Large leak diagnostic displaced purge volume threshold as a function of barometric pressure**Value Units:** Displaced purge volume threshold (liters)**X Unit:** Barometric pressure (kPa)

y/x	70	80	90	100	110
1	10.0	10.0	10.0	10.0	10.0

**Initial Supporting table - P0455 large leak diagnostic tank vacuum threshold****Description:** Large leak diagnostic tank vacuum threshold as a function of barometric pressure**Value Units:** Vacuum (Pa)**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	2,000	2,000	2,000	2,000	2,000



**Initial Supporting table - P0496 purge valve leak diagnostic vacuum threshold****Description:** Purge valve leak diagnostic vacuum failure threshold (Pa) as a function of barometric pressure (kPa)**Value Units:** Vacuum (Pa)**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	2,500	2,500	2,500	2,500	2,500

## Initial Supporting table - P0496 purge valve leak test time as a function of fuel level and barometric pressure

**Description:** Purge valve leak test time as a function of fuel level (%) and barometric pressure (kPa)**Value Units:** Time (Seconds)**X Unit:** Barometric pressure (kPa)**Y Units:** Fuel level (%)

y/x	70	80	90	100	110
0	67	67	67	67	67
6	65	65	65	65	65
13	64	64	64	64	64
19	62	62	62	62	62
25	61	61	61	61	61
31	59	59	59	59	59
38	58	58	58	58	58
44	56	56	56	56	56
50	55	55	55	55	55
56	53	53	53	53	53
63	52	52	52	52	52
69	50	50	50	50	50
75	49	49	49	49	49
81	47	47	47	47	47
88	46	46	46	46	46
94	44	44	44	44	44
100	43	43	43	43	43

## Initial Supporting table - P0521\_CVDOP\_MaxOilPressure

**Description:** Maximum oil pressure threshold.

**X Unit:** Engine Speed, RPM

y/x	40	50	60	70	80	90	100	110	120
1,000	610	610	610	610	610	610	610	610	610
1,500	610	610	610	610	610	610	610	610	610
2,000	610	610	610	610	610	610	610	610	610
2,500	610	610	610	610	610	610	610	610	610
3,000	610	610	610	610	610	610	610	610	610
3,500	610	610	610	610	610	610	610	610	610
4,000	610	610	610	610	610	610	610	610	610
4,500	610	610	610	610	610	610	610	610	610
5,000	610	610	610	610	610	610	610	610	610

## Initial Supporting table - P0521\_CVDOP\_MinOilPresFail

**Description:** Minimum Oil Pressure fail Threshold**X Unit:** Engine Speed (RPM)

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
1	73	73	73	83	98	108	113	113	169

## Initial Supporting table - P06DD\_CVDOP\_MaxDesPress

**Description:** The maximum desired pressure, above which the stuck diagnostic will be disabled.

**Value Units:** Desired oil pressure, kPa

**X Unit:** Engine oil temperature, °C

y/x	-20	0	20	40	60	80	100	120	140
1	508	432	408	408	408	408	408	408	408

## Initial Supporting table - P06DD\_CVDOP\_MaxPressErr

**Description:** Error threshold to set the oil pump performance fault.

**Value Units:** Absolute Oil Pressure Error, kPa

**X Unit:** Engine Speed, RPM

**Y Units:** Engine oil temperature, °C

y/x	600	1,000	1,500	2,000	3,000	4,200	4,201	5,000	6,000
-20	120	120	110	100	90	80	80	70	70
0	105	105	100	90	80	70	70	60	60
20	100	100	90	65	65	60	60	60	60
40	50	50	50	50	50	53	70	55	55
60	50	50	50	50	50	53	70	55	55
80	50	50	50	50	50	53	70	55	55
100	60	50	50	50	50	53	75	55	55
120	50	50	50	50	50	53	75	55	55
140	50	50	50	50	50	53	80	55	55

## Initial Supporting table - P06DD\_CVDOP\_MinDesPres

**Description:** The minimum desired pressure, below which the stuck diagnostic will be disabled.

**Value Units:** Desired oil pressure, kPa

**X Unit:** Engine oil temperature, °C

y/x	-20	0	20	40	60	80	100	120	140
1	200	200	175	145	145	145	145	145	145

## 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	0.06	0.06	0.06	0.06	0.06



**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	0.05	0.05	0.05	0.05	0.05

## Initial Supporting table - P219A Quality Factor Bank1 Table

**Description:** Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for the current sample period

**Value Units:** Unitless Scalar

**X Unit:** Engine Speed (RPM)

**Y Units:** Air Per Cylinder (APC) (mg/cylinder)

y/x	600	920	1,240	1,560	1,880	2,200	2,520	2,840	3,160	3,480	3,800	4,120	4,440	4,760	5,080	5,400	5,720
40	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
80	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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	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	0.00	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	0.00	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	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	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

## Initial Supporting table - P26CE Pump Overspeed Fail Threshold

## Description:

**Value Units:** Pump overspeed failure threshold (RPM)**X Unit:** Commanded pump speed (RPM)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
1	-100	-100	-200	-300	-400	-500	-600	-700	-800	-900

## Initial Supporting table - P26CE Pump Overspeed Fail Threshold Low Voltage

**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	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
1	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999

## Initial Supporting table - P2B85 Pump Underspeed Fail Threshold

**Description:** Pump underspeed failure threshold as a function of pump requested speed

**Value Units:** Pump underspeed failure threshold (RPM)

**X Unit:** Commanded pump speed (RPM)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
1	100	100	200	300	400	500	600	700	800	900

**Initial Supporting table - P2B85 Pump Underspeed Fail Threshold Low Voltage****Description:** Pump underspeed failure threshold in a low voltage condition as a function of pump requested speed**Value Units:** Pump underspeed failure threshold low voltage (RPM)**X Unit:** Commanded pump speed (RPM)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
1	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999

Initial Supporting table - P3075 3076 Pump Current Performance Coolant Distribution Mode

**Description:** Current performance intrusive test enable condition as a function of coolant distribution mode selection

**Value Units:** Coolant distribution mode selection to enable diagnostic

**X Unit:** Coolant distribution mode enumeration

y/x	0	1	2	3	4	5
1	0	0	0	1	1	1

**Initial Supporting table - P3075 3076 Pump Current Performance Coolant System Mode Select****Description:** Current performance intrusive test enable condition as a function of coolant system mode selection**Value Units:** Coolant system mode selection to enable diagnostic**X Unit:** Coolant System Mode Enumeration

y/x	0	1	2	3	4	5	6	7	8	9	10
1	0	0	0	1	0	0	0	0	1	1	1



**Initial Supporting table - P3075 3076 Pump Current Scaled****Description:** Pump current scaled based on engine inlet coolant temperature**Value Units:** Pump current scaled (A)**X Unit:** Engine inlet coolant temperature (Deg C)

y/x	40	50	60	70	80	90	100	110	120	130
1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

## Initial Supporting table - P3075 Pump Low Current Passive Test Fail Threshold

**Description:** Low current passive test failure threshold as a function of pump command speed and flow restriction

**Value Units:** Pump passive test low current failure threshold (A)

**X Unit:** Coolant Flow Restriction (Unitless)

**Y Units:** Commanded Pump Speed (RPM)

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
810	1	1	3	3	3	3	3	3	3	3
1,000	1	1	3	3	3	3	3	3	3	3
1,250	1	1	3	3	3	4	4	4	4	4
1,600	1	1	4	4	4	5	5	5	5	5
2,000	1	1	5	5	6	6	6	7	7	7
2,500	1	1	7	7	8	9	9	9	10	10
3,000	1	1	9	10	11	12	12	13	14	14
4,000	1	1	15	17	18	20	21	22	23	23
5,000	1	1	23	25	27	31	32	33	35	36
6,180	1	1	35	39	42	47	49	52	54	55

## Initial Supporting table - P3075 Pump Low Current Performance Failure Threshold

**Description:** Low current performance failure threshold as a function of coolant restriction correction

**Value Units:** Pump low current failure threshold (A)

**X Unit:** Coolant restriction correction

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	1.0	1.0	15.2	16.6	17.9	19.9	20.7	21.7	22.6	23.0

## Initial Supporting table - P3076 Pump High Current Passive Test Fail Threshold

**Description:** High current passive test failure threshold as a function of pump command speed and flow restriction

**Value Units:** Pump passive test high current failure threshold (A)

**X Unit:** Coolant Flow Restriction (Unitless)

**Y Units:** Commanded Pump Speed (RPM)

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
810	80	80	4	4	4	4	5	5	5	5
1,000	80	80	4	4	5	5	5	5	5	5
1,250	80	80	5	5	5	5	5	6	6	6
1,600	80	80	6	6	6	7	7	7	8	8
2,000	80	80	8	8	9	9	10	10	10	10
2,500	80	80	10	11	12	13	14	14	15	15
3,000	80	80	14	15	16	18	19	19	20	21
4,000	80	80	23	25	27	30	31	32	34	35
5,000	80	80	35	38	41	46	48	50	52	54
6,180	80	80	53	58	63	71	74	78	80	80

## Initial Supporting table - P3076 Pump High Current Performance Failure Threshold

## Description:

**Value Units:** Pump high current failure threshold (A)

**X Unit:** Coolant restriction correction

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	80.0	80.0	22.9	24.9	26.9	29.8	31.1	32.5	33.9	34.6

**Initial Supporting table - Purge Pump Diagnostic IAT Multiplier Factor****Description:** Purge pump diagnostic IAT multiplier factor as a function of intake air temperature (deg C)**Value Units:** Purge pump diagnostic IAT multiplier factor (unitless)**X Unit:** Intake air temperature (deg C)

y/x	-40	-20	0	20	40	60	80	100	120
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## Initial Supporting table - Purge Pump Misassembled Failure Threshold

**Description:** Misassembled failure threshold (kPa) as a function of barometric pressure (kPa) and purge pump speed (RPM)

**Value Units:** Misassembled failure threshold (kPa)

**X Unit:** Barometric pressure (kPa)

**Y Units:** Purge pump speed (RPM)

y/x	70	80	90	100	110
35,000	0.5	0.5	0.5	0.5	0.5
36,000	0.5	0.5	0.5	0.5	0.5
37,000	0.6	0.6	0.6	0.6	0.6
38,000	0.6	0.6	0.6	0.6	0.6
39,000	0.6	0.6	0.6	0.6	0.6
40,000	0.7	0.7	0.7	0.7	0.7
41,000	0.7	0.7	0.7	0.7	0.7
42,000	0.7	0.7	0.7	0.7	0.7
43,000	0.8	0.8	0.8	0.8	0.8
44,000	0.8	0.8	0.8	0.8	0.8
45,000	0.8	0.8	0.8	0.8	0.8
46,000	0.9	0.9	0.9	0.9	0.9
47,000	0.9	0.9	0.9	0.9	0.9
48,000	0.9	0.9	0.9	0.9	0.9
49,000	1.0	1.0	1.0	1.0	1.0
50,000	1.0	1.0	1.0	1.0	1.0
51,000	1.1	1.1	1.1	1.1	1.1

## Initial Supporting table - Purge pump performance high flow ratio threshold

**Description:** Purge pump flow ratio = estimated purge flow as func(pressure across purge solenoid valve) / failure threshold purge flow as func(purge valve duty cycle, barometric pressue)

**Value Units:** Purge pump flow ratio (unitless)

**X Unit:** Barometric pressure (kPa)

**Y Units:** Purge solenoid duty cycle (Percent)

y/x	70	80	90	100	110
0	14.4	16.2	18.0	20.1	21.7
6	14.4	16.2	18.0	20.1	21.7
12	14.4	16.2	18.0	20.1	21.7
18	14.4	16.2	18.0	20.1	21.7
24	14.4	16.2	18.0	20.1	21.7
30	14.4	16.2	18.0	20.1	21.7
36	14.4	16.2	18.0	20.1	21.6
42	14.3	16.1	17.9	20.0	21.6
48	14.2	16.0	17.8	19.8	21.4
54	14.1	15.9	17.6	19.6	21.2
60	13.9	15.7	17.4	19.4	20.9
66	13.7	15.4	17.2	19.1	20.6
72	13.5	15.2	16.9	18.8	20.2
78	13.3	14.9	16.6	18.4	19.9
84	13.0	14.6	16.2	18.0	19.5
90	12.7	14.2	15.8	17.6	19.2
100	12.2	13.7	15.2	16.9	18.6



## Initial Supporting table - Purge pump performance low flow ratio threshold

**Description:** Purge pump flow ratio = Estimated purge flow as func(pressure across purge solenoid valve) / failure threshold purge flow as func(purge valve duty cycle, barometric pressure)

**Value Units:** Purge pump flow ratio (unitless)

**X Unit:** Barometric pressure (kPa)

**Y Units:** Purge solenoid duty cycle (Percent)

y/x	70	80	90	100	110
0	2.2	2.3	2.4	2.5	2.6
6	2.1	2.2	2.3	2.4	2.5
12	2.0	2.1	2.2	2.3	2.4
18	1.9	2.0	2.2	2.3	2.4
24	1.9	2.0	2.1	2.2	2.3
30	1.8	1.9	2.0	2.1	2.2
36	1.7	1.8	1.9	2.0	2.1
42	1.6	1.7	1.8	1.9	2.1
48	1.5	1.6	1.7	1.9	2.0
54	1.4	1.5	1.7	1.8	1.9
60	1.3	1.5	1.6	1.7	1.8
66	1.2	1.4	1.5	1.6	1.7
72	1.2	1.3	1.4	1.5	1.7
78	1.1	1.2	1.3	1.5	1.6
84	1.0	1.1	1.2	1.4	1.5
90	0.9	1.0	1.2	1.3	1.4
100	0.9	1.0	1.2	1.3	1.4

**Initial Supporting table - Purge pump speed on value too high****Description:** Purge pump speed (RPM) error limit as a function of purge pump voltage (volts)**Value Units:** Purge pump speed (RPM)**X Unit:** Purge pump voltage (volts)

y/x	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000

## Initial Supporting table - Purge pump speed on value too low

**Description:** Purge pump speed (RPM) error limit as a function of purge pump voltage (volts)

**Value Units:** Purge pump speed (RPM)

**X Unit:** Purge pump voltage (volts)

y/x	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	29,400	29,400	29,400	32,100	34,700	36,700	38,600	39,300	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000

## Initial Supporting table - Purge System High Purge Flow Enable

**Description:** Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

**Value Units:** Purge pump flow ratio (unitless)

**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	1.1	1.1	1.1	1.1	1.1
2	1.1	1.1	1.1	1.1	1.1
3	1.1	1.1	1.1	1.1	1.1
4	1.1	1.1	1.1	1.1	1.1
5	1.1	1.1	1.1	1.1	1.1
6	1.1	1.1	1.1	1.1	1.1
7	1.1	1.1	1.1	1.1	1.1
8	1.1	1.1	1.1	1.1	1.1
9	1.1	1.1	1.1	1.1	1.1
10	1.1	1.1	1.1	1.1	1.1
11	1.1	1.1	1.1	1.1	1.1
12	1.1	1.1	1.1	1.1	1.1
13	1.1	1.1	1.1	1.1	1.1
14	1.1	1.1	1.1	1.1	1.1
15	1.1	1.1	1.1	1.1	1.1
16	1.1	1.1	1.1	1.1	1.1
17	1.1	1.1	1.1	1.1	1.1

## Initial Supporting table - Purge System High Purge Flow Remain Enabled

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

**Description:** Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)**Value Units:** Purge pump flow ratio (unitless)**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	1.2	1.2	1.2	1.2	1.2
2	1.2	1.2	1.2	1.2	1.2
3	1.2	1.2	1.2	1.2	1.2
4	1.2	1.2	1.2	1.2	1.2
5	1.2	1.2	1.2	1.2	1.2
6	1.2	1.2	1.2	1.2	1.2
7	1.2	1.2	1.2	1.2	1.2
8	1.2	1.2	1.2	1.2	1.2
9	1.2	1.2	1.2	1.2	1.2
10	1.2	1.2	1.2	1.2	1.2
11	1.2	1.2	1.2	1.2	1.2
12	1.2	1.2	1.2	1.2	1.2
13	1.2	1.2	1.2	1.2	1.2
14	1.2	1.2	1.2	1.2	1.2
15	1.2	1.2	1.2	1.2	1.2
16	1.2	1.2	1.2	1.2	1.2
17	1.2	1.2	1.2	1.2	1.2

## Initial Supporting table - Purge System Low Purge Flow Enable

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

**Description:** Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)**Value Units:** Purge pump flow ratio (unitless)**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	-0.1	-0.1	-0.1	-0.1	-0.1
2	-0.1	-0.1	-0.1	-0.1	-0.1
3	-0.1	-0.1	-0.1	-0.1	-0.1
4	-0.1	-0.1	-0.1	-0.1	-0.1
5	-0.1	-0.1	-0.1	-0.1	-0.1
6	-0.1	-0.1	-0.1	-0.1	-0.1
7	-0.1	-0.1	-0.1	-0.1	-0.1
8	-0.1	-0.1	-0.1	-0.1	-0.1
9	-0.1	-0.1	-0.1	-0.1	-0.1
10	-0.1	-0.1	-0.1	-0.1	-0.1
11	-0.1	-0.1	-0.1	-0.1	-0.1
12	-0.1	-0.1	-0.1	-0.1	-0.1
13	-0.1	-0.1	-0.1	-0.1	-0.1
14	-0.1	-0.1	-0.1	-0.1	-0.1
15	-0.1	-0.1	-0.1	-0.1	-0.1
16	-0.1	-0.1	-0.1	-0.1	-0.1
17	-0.1	-0.1	-0.1	-0.1	-0.1

## Initial Supporting table - Purge System Low Purge Flow Remain Enabled

**Description:** Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

**Value Units:** Purge pump flow ratio (unitless)

**X Unit:** Barometric pressure (kPa)

y/x	1	2	3	4	5
1	-0.2	-0.2	-0.2	-0.2	-0.2
2	-0.2	-0.2	-0.2	-0.2	-0.2
3	-0.2	-0.2	-0.2	-0.2	-0.2
4	-0.2	-0.2	-0.2	-0.2	-0.2
5	-0.2	-0.2	-0.2	-0.2	-0.2
6	-0.2	-0.2	-0.2	-0.2	-0.2
7	-0.2	-0.2	-0.2	-0.2	-0.2
8	-0.2	-0.2	-0.2	-0.2	-0.2
9	-0.2	-0.2	-0.2	-0.2	-0.2
10	-0.2	-0.2	-0.2	-0.2	-0.2
11	-0.2	-0.2	-0.2	-0.2	-0.2
12	-0.2	-0.2	-0.2	-0.2	-0.2
13	-0.2	-0.2	-0.2	-0.2	-0.2
14	-0.2	-0.2	-0.2	-0.2	-0.2
15	-0.2	-0.2	-0.2	-0.2	-0.2
16	-0.2	-0.2	-0.2	-0.2	-0.2
17	-0.2	-0.2	-0.2	-0.2	-0.2

## Initial Supporting table - TimeForOilAeration

**Description:** The timer limit to declare an engine oil aeration condition exists.

**X Unit:** Engine oil temperature (deg C)

y/x	-40	-20	0	25	35	60	80	100	120	130	140
1	30	30	30	30	30	30	30	30	30	30	30



### 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\_Cell00\_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\_PurgOnAirMode0 = 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\_PurgOffAirMode1 = 12,  
 CeFADR\_e\_Cell13\_PurgOffAirMode0 = 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 accumulated 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:** Accumulated 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 - P0011\_CamPosErrorLimlc1

**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	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_EngOilPressEnblIc

**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	6	4	3	3	3	3	1	1	1	1	1	1	1	2	2

## 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	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

## 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	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

## 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	200	200	180	160	150	150	150	150	150	150	150	150	150	150	150	150	150

## 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	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80



## 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	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_LoRpmLoDsblc

**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	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

**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	8	8	8	4	3	2	2	2	1	1	1	1	1	1	1	2	2

## Initial Supporting table - P0011\_P05CC\_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	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

## Initial Supporting table - P0014\_CamPosErrorLimEc1

**Description:** Maximum Exhaust Cam 1 phase error as a function of engine speed and engine oil temperature.

**Value Units:** Maximum Exhaust 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	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

## 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	8	8	6	4	3	3	3	3	1	1	1	1	1	1	1	2	2

**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	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

## 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	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800



## Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoPresHiEnbIEc

**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	200	200	180	160	150	150	150	150	150	150	150	150	150	150	150	150	150

## 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	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80

## Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoRpmHiEnbIEc

**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	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

## 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	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

## Initial Supporting table - P0014\_P05CE\_StablePositionTimeEc1

**Description:** Minimum time for Exhaust 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	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

**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	35.0	10.0	7.0	5.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	50.0	24.0	14.0	10.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0

**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	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0



## Initial Supporting table - P0071: OAT Performance 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	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

**Initial Supporting table - P00C4 P2261: Compressor Surge Line****Description:** Turbo compressor recirculation valve diagnosis surge area limit.**Value Units:** [ratio] CRV diagnosis surge area limit.**X Unit:** [g/sec] KnBSTD\_dm\_AirFlowBP - Air FLOW

y/x	5.00	10.00	25.00	35.00	50.00	85.00
1	1.030	1.190	1.390	1.610	2.060	3.150

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

**Description:** Turbocharger Intake Flow Rationality Diagnostic Failure Matrix - This table describes combinations of individual model failures that will set P0101, P0106, P010B, P0121, P0236 and P1101 on turbocharged applications.

**Value Units:** Boolean

**X Unit:** Unitless (See top line for heading information)

**Y Units:** Unitless

y/x	1	2	3	4	5	6	7	8	9
1	MAF Model	MAP1 Model	MAP2 Model	MAP3 Model	TIAP1 Model	TPS Model	TIAP Correlation	TIAP Correlation	DTC Set
2	Failed	Failed	Failed	Failed	Failed	Failed	Failed	Valid	
3	F	F	F	F	F	F	F	F	No DTC
4	F	F	F	F	F	F	F	T	No DTC
5	F	F	F	F	F	F	T	F	No DTC
6	F	F	F	F	F	F	T	T	No DTC
7	F	F	F	F	F	T	F	F	No DTC
8	F	F	F	F	F	T	F	T	No DTC
9	F	F	F	F	F	T	T	F	No DTC
10	F	F	F	F	F	T	T	T	No DTC
11	F	F	F	F	T	F	F	F	No DTC
12	F	F	F	F	T	F	F	T	No DTC
13	F	F	F	F	T	F	T	F	No DTC
14	F	F	F	F	T	F	T	T	No DTC
15	F	F	F	F	T	T	F	F	P1101
16	F	F	F	F	T	T	F	T	P0121
17	F	F	F	F	T	T	T	F	P1101
18	F	F	F	F	T	T	T	T	P0236
19	F	F	F	T	F	F	F	F	No DTC
20	F	F	F	T	F	F	F	T	No DTC
21	F	F	F	T	F	F	T	F	P1101
22	F	F	F	T	F	F	T	T	P1101
23	F	F	F	T	F	T	F	F	P1101
24	F	F	F	T	F	T	F	T	P1101
25	F	F	F	T	F	T	T	F	P1101
26	F	F	F	T	F	T	T	T	P1101
27	F	F	F	T	T	F	F	F	P1101
28	F	F	F	T	T	F	F	T	P1101
29	F	F	F	T	T	F	T	F	P1101
30	F	F	F	T	T	F	T	T	P1101
31	F	F	F	T	T	T	F	F	P1101

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

32	F	F	F	T	T	T	F	T	P1101
33	F	F	F	T	T	T	T	F	P1101
34	F	F	F	T	T	T	T	T	P1101
35	F	F	T	F	F	F	F	F	No DTC
36	F	F	T	F	F	F	F	T	No DTC
37	F	F	T	F	F	F	T	F	P1101
38	F	F	T	F	F	F	T	T	P1101
39	F	F	T	F	F	T	F	F	P1101
40	F	F	T	F	F	T	F	T	P1101
41	F	F	T	F	F	T	T	F	P1101
42	F	F	T	F	F	T	T	T	P1101
43	F	F	T	F	T	F	F	F	P1101
44	F	F	T	F	T	F	F	T	P1101
45	F	F	T	F	T	F	T	F	P1101
46	F	F	T	F	T	F	T	T	P1101
47	F	F	T	F	T	T	F	F	P1101
48	F	F	T	F	T	T	F	T	P1101
49	F	F	T	F	T	T	T	F	P1101
50	F	F	T	F	T	T	T	T	P1101
51	F	F	T	T	F	F	F	F	P1101
52	F	F	T	T	F	F	F	T	P1101
53	F	F	T	T	F	F	T	F	P1101
54	F	F	T	T	F	F	T	T	P1101
55	F	F	T	T	F	T	F	F	P1101
56	F	F	T	T	F	T	F	T	P1101
57	F	F	T	T	F	T	T	F	P1101
58	F	F	T	T	F	T	T	T	P1101
59	F	F	T	T	T	F	F	F	No DTC
60	F	F	T	T	T	F	F	T	No DTC
61	F	F	T	T	T	F	T	F	No DTC
62	F	F	T	T	T	F	T	T	No DTC
63	F	F	T	T	T	T	F	F	P1101
64	F	F	T	T	T	T	F	T	P1101
65	F	F	T	T	T	T	T	F	P1101
66	F	F	T	T	T	T	T	T	P1101
67	F	T	F	F	F	F	F	F	No DTC
68	F	T	F	F	F	F	F	T	No DTC
69	F	T	F	F	F	F	T	F	P1101

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

70	F	T	F	F	F	F	T	T	P0236
71	F	T	F	F	F	T	F	F	P1101
72	F	T	F	F	F	T	F	T	P0121
73	F	T	F	F	F	T	T	F	P1101
74	F	T	F	F	F	T	T	T	P0236
75	F	T	F	F	T	F	F	F	P1101
76	F	T	F	F	T	F	F	T	P1101
77	F	T	F	F	T	F	T	F	P1101
78	F	T	F	F	T	F	T	T	P0236
79	F	T	F	F	T	T	F	F	P1101
80	F	T	F	F	T	T	F	T	P0121
81	F	T	F	F	T	T	T	F	P1101
82	F	T	F	F	T	T	T	T	P0236
83	F	T	F	T	F	F	F	F	P1101
84	F	T	F	T	F	F	F	T	P1101
85	F	T	F	T	F	F	T	F	P1101
86	F	T	F	T	F	F	T	T	P1101
87	F	T	F	T	F	T	F	F	P1101
88	F	T	F	T	F	T	F	T	P1101
89	F	T	F	T	F	T	T	F	P1101
90	F	T	F	T	F	T	T	T	P1101
91	F	T	F	T	T	F	F	F	P1101
92	F	T	F	T	T	F	F	T	P1101
93	F	T	F	T	T	F	T	F	P1101
94	F	T	F	T	T	F	T	T	P1101
95	F	T	F	T	T	T	F	F	P1101
96	F	T	F	T	T	T	F	T	P1101
97	F	T	F	T	T	T	T	F	P1101
98	F	T	F	T	T	T	T	T	P1101
99	F	T	T	F	F	F	F	F	P1101
100	F	T	T	F	F	F	F	T	P1101
101	F	T	T	F	F	F	T	F	P1101
102	F	T	T	F	F	F	T	T	P1101
103	F	T	T	F	F	T	F	F	P1101
104	F	T	T	F	F	T	F	T	P1101
105	F	T	T	F	F	T	T	F	P1101
106	F	T	T	F	F	T	T	T	P1101
107	F	T	T	F	T	F	F	F	P1101

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

108	F	T	T	F	T	F	F	T	P1101
109	F	T	T	F	T	F	T	F	P1101
110	F	T	T	F	T	F	T	T	P1101
111	F	T	T	F	T	T	F	F	P1101
112	F	T	T	F	T	T	F	T	P1101
113	F	T	T	F	T	T	T	F	P1101
114	F	T	T	F	T	T	T	T	P1101
115	F	T	T	T	F	F	F	F	P0106
116	F	T	T	T	F	F	F	T	P0106
117	F	T	T	T	F	F	T	F	P0106
118	F	T	T	T	F	F	T	T	P0106
119	F	T	T	T	F	T	F	F	P1101
120	F	T	T	T	F	T	F	T	P1101
121	F	T	T	T	F	T	T	F	P1101
122	F	T	T	T	F	T	T	T	P1101
123	F	T	T	T	T	F	F	F	P1101
124	F	T	T	T	T	F	F	T	P1101
125	F	T	T	T	T	F	T	F	P1101
126	F	T	T	T	T	F	T	T	P1101
127	F	T	T	T	T	T	F	F	P1101
128	F	T	T	T	T	T	F	T	P1101
129	F	T	T	T	T	T	T	F	P1101
130	F	T	T	T	T	T	T	T	P1101
131	T	F	F	F	F	F	F	F	No DTC
132	T	F	F	F	F	F	F	T	No DTC
133	T	F	F	F	F	F	T	F	P1101
134	T	F	F	F	F	F	T	T	P0236
135	T	F	F	F	F	T	F	F	P1101
136	T	F	F	F	F	T	F	T	P0121
137	T	F	F	F	F	T	T	F	P1101
138	T	F	F	F	F	T	T	T	P0236
139	T	F	F	F	T	F	F	F	P1101
140	T	F	F	F	T	F	F	T	P1101
141	T	F	F	F	T	F	T	F	P1101
142	T	F	F	F	T	F	T	T	P0236
143	T	F	F	F	T	T	F	F	P1101
144	T	F	F	F	T	T	F	T	P0121
145	T	F	F	F	T	T	T	F	P1101

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

146	T	F	F	F	T	T	T	T	P0236
147	T	F	F	T	F	F	F	F	P1101
148	T	F	F	T	F	F	F	T	P1101
149	T	F	F	T	F	F	T	F	P1101
150	T	F	F	T	F	F	T	T	P1101
151	T	F	F	T	F	T	F	F	P1101
152	T	F	F	T	F	T	F	T	P1101
153	T	F	F	T	F	T	T	F	P1101
154	T	F	F	T	F	T	T	T	P1101
155	T	F	F	T	T	F	F	F	P1101
156	T	F	F	T	T	F	F	T	P1101
157	T	F	F	T	T	F	T	F	P1101
158	T	F	F	T	T	F	T	T	P1101
159	T	F	F	T	T	T	F	F	P1101
160	T	F	F	T	T	T	F	T	P1101
161	T	F	F	T	T	T	T	F	P1101
162	T	F	F	T	T	T	T	T	P1101
163	T	F	T	F	F	F	F	F	P1101
164	T	F	T	F	F	F	F	T	P1101
165	T	F	T	F	F	F	T	F	P1101
166	T	F	T	F	F	F	T	T	P1101
167	T	F	T	F	F	T	F	F	P1101
168	T	F	T	F	F	T	F	T	P1101
169	T	F	T	F	F	T	T	F	P1101
170	T	F	T	F	F	T	T	T	P1101
171	T	F	T	F	T	F	F	F	P1101
172	T	F	T	F	T	F	F	T	P1101
173	T	F	T	F	T	F	T	F	P1101
174	T	F	T	F	T	F	T	T	P1101
175	T	F	T	F	T	T	F	F	P1101
176	T	F	T	F	T	T	F	T	P1101
177	T	F	T	F	T	T	T	F	P1101
178	T	F	T	F	T	T	T	T	P1101
179	T	F	T	T	F	F	F	F	P1101
180	T	F	T	T	F	F	F	T	P1101
181	T	F	T	T	F	F	T	F	P1101
182	T	F	T	T	F	F	T	T	P1101
183	T	F	T	T	F	T	F	F	P1101

## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

184	T	F	T	T	F	T	F	T	P1101
185	T	F	T	T	F	T	T	F	P1101
186	T	F	T	T	F	T	T	T	P1101
187	T	F	T	T	T	F	F	F	P0101 or P010B
188	T	F	T	T	T	F	F	T	P0101 or P010B
189	T	F	T	T	T	F	T	F	P0101 or P010B
190	T	F	T	T	T	F	T	T	P0101 or P010B
191	T	F	T	T	T	T	F	F	P1101
192	T	F	T	T	T	T	F	T	P1101
193	T	F	T	T	T	T	T	F	P1101
194	T	F	T	T	T	T	T	T	P1101
195	T	T	F	F	F	F	F	F	P1101
196	T	T	F	F	F	F	F	T	P1101
197	T	T	F	F	F	F	T	F	P1101
198	T	T	F	F	F	F	T	T	P0236
199	T	T	F	F	F	T	F	F	P1101
200	T	T	F	F	F	T	F	T	P0121
201	T	T	F	F	F	T	T	F	P1101
202	T	T	F	F	F	T	T	T	P0236
203	T	T	F	F	T	F	F	F	P1101
204	T	T	F	F	T	F	F	T	P1101
205	T	T	F	F	T	F	T	F	P1101
206	T	T	F	F	T	F	T	T	P0236
207	T	T	F	F	T	T	F	F	P1101
208	T	T	F	F	T	T	F	T	P0121
209	T	T	F	F	T	T	T	F	P1101
210	T	T	F	F	T	T	T	T	P0236
211	T	T	F	T	F	F	F	F	P1101
212	T	T	F	T	F	F	F	T	P1101
213	T	T	F	T	F	F	T	F	P1101
214	T	T	F	T	F	F	T	T	P1101
215	T	T	F	T	F	T	F	F	P1101
216	T	T	F	T	F	T	F	T	P1101
217	T	T	F	T	F	T	T	F	P1101
218	T	T	F	T	F	T	T	T	P1101
219	T	T	F	T	T	F	F	F	P1101
220	T	T	F	T	T	F	F	T	P1101
221	T	T	F	T	T	F	T	F	P1101



## Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

222	T	T	F	T	T	F	T	T	P1101
223	T	T	F	T	T	T	F	F	P1101
224	T	T	F	T	T	T	F	T	P1101
225	T	T	F	T	T	T	T	F	P1101
226	T	T	F	T	T	T	T	T	P1101
227	T	T	T	F	F	F	F	F	P1101
228	T	T	T	F	F	F	F	T	P1101
229	T	T	T	F	F	F	T	F	P1101
230	T	T	T	F	F	F	T	T	P1101
231	T	T	T	F	F	T	F	F	P1101
232	T	T	T	F	F	T	F	T	P1101
233	T	T	T	F	F	T	T	F	P1101
234	T	T	T	F	F	T	T	T	P1101
235	T	T	T	F	T	F	F	F	P1101
236	T	T	T	F	T	F	F	T	P1101
237	T	T	T	F	T	F	T	F	P1101
238	T	T	T	F	T	F	T	T	P1101
239	T	T	T	F	T	T	F	F	P1101
240	T	T	T	F	T	T	F	T	P1101
241	T	T	T	F	T	T	T	F	P1101
242	T	T	T	F	T	T	T	T	P1101
243	T	T	T	T	F	F	F	F	P1101
244	T	T	T	T	F	F	F	T	P1101
245	T	T	T	T	F	F	T	F	P1101
246	T	T	T	T	F	F	T	T	P1101
247	T	T	T	T	F	T	F	F	P1101
248	T	T	T	T	F	T	F	T	P1101
249	T	T	T	T	F	T	T	F	P1101
250	T	T	T	T	F	T	T	T	P1101
251	T	T	T	T	T	F	F	F	P1101
252	T	T	T	T	T	F	F	T	P1101
253	T	T	T	T	T	F	T	F	P1101
254	T	T	T	T	T	F	T	T	P1101
255	T	T	T	T	T	T	F	F	P1101
256	T	T	T	T	T	T	F	T	P1101
257	T	T	T	T	T	T	T	F	P1101
258	T	T	T	T	T	T	T	T	P1101

## Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

**Description:** P0101\_P0106\_P0121\_P012B\_P0236\_P1101 MAP1 Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)

**X Unit:** Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
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	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.840	0.840	0.840	0.840	0.834	0.836	0.934	1.000	0.900	0.900	0.900	0.790	0.790	0.790	0.790	0.790	0.790

## Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM

**Description:** P0101\_P0106\_P0121\_P012B\_P0236\_P1101 MAP3 Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)

**X Unit:** Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.840	0.840	0.840	0.840	0.835	0.832	0.933	1.000	1.000	0.900	0.900	0.790	0.790	0.790	0.790	0.790	0.790

## 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	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
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, P0236, P1101: TIAP Residual Weight Factor based on RPM

**Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP Residual Weight Factor based on RPM

**Value Units:** Weight Factor (Unitless)

**X Unit:** Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.730	0.730	0.730	0.730	0.718	0.731	0.810	0.841	0.821	0.861	0.900	0.820	0.820	0.820	0.820	0.820	0.820

**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-Baro Correlation Max Air Flow**Value Units:** Engine Air Flow (Grams/Second)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	25.5	25.4	34.9	38.8	43.6	48.8	51.3	55.1	55.1

**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-Baro Correlation Max MAP**Value Units:** Manifold Pressure (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	106.2	106.5	88.5	77.4	70.0	73.3	71.6	66.4	66.4



**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-Baro Correlation Offset**Value Units:** Pressure Difference (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	4.4	4.4	4.9	5.6	6.0	6.6	7.4	8.8	8.8

**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-MAP Correlation Min Air Flow**Value Units:** Engine Air Flow (Grams/Second)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	21.7	23.0	50.2	67.2	83.5	96.8	107.5	108.2	108.2

**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-MAP Correlation Min MAP**Value Units:** Manifold Pressure (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	101.5	102.2	113.0	117.7	123.7	124.3	125.2	120.4	120.4

**Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset****Description:** P0101\_P0106\_P0121\_P0236\_P1101 TIAP-MAP Correlation Offset**Value Units:** Pressure Difference (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	3.3	3.1	4.1	4.0	4.3	5.3	5.7	10.3	10.3

## Initial Supporting table - P050D\_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	35	35	35	35	35
0.125	35	35	35	35	35
0.250	35	35	35	35	35
0.375	35	35	35	35	35
0.500	35	35	35	35	35
0.625	35	35	35	35	35
0.750	35	35	35	35	35
0.875	35	35	35	35	35
1.000	35	35	35	35	35

## 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	35	35	35	35	35
0.125	35	35	35	35	35
0.250	35	35	35	35	35
0.375	35	35	35	35	35
0.500	35	35	35	35	35
0.625	35	35	35	35	35
0.750	35	35	35	35	35
0.875	35	35	35	35	35
1.000	35	35	35	35	35

**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\_TimeWght for 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	700	770	780	800	825	850	875	900	925	1,000	1,050	1,100	1,250	1,400	1,600	2,000
1	1	1	1	4	4	4	4	4	12	16	16	16	16	16	16	16	16

**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. ExhEngyPerUnitMass 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	-5	-2	-1	0	5	10	20
1	1.50	1.50	1.50	0.50	0.31	0.31	0.31	0.13	0.13

**Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est****Description:** P0101\_P0106\_P010B\_P0121\_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	15	30	45	60	75	82	85	89	95	100	110	120	150	200	230	250
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	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.976	0.940	0.939	0.988	1.000	1.000	1.000	1.000	1.000	1.000

## 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.

## 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	1,000.000	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_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	3	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_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 - P16F3\_Delta MAP Threshold f(Desired Engine Torque)****Description:** Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	32.32	32.32	32.32	32.32	32.32	32.32



## Initial Supporting table - P16F3\_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.

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
350.00	148.50	129.83	127.50	135.50	117.00	67.50
450.00	148.50	129.83	127.50	135.50	117.00	67.50
550.00	148.50	129.83	127.50	135.50	117.00	67.50
650.00	148.50	129.83	127.50	135.50	117.00	67.50
750.00	148.50	129.83	127.50	135.50	117.00	67.50
850.00	156.02	136.02	134.44	139.24	120.10	73.51
900.00	160.78	139.12	138.45	139.20	119.73	77.52
1,100.00	170.53	142.20	146.42	137.28	117.27	86.15
1,200.00	183.57	145.29	155.64	139.01	118.29	94.78
1,300.00	191.74	151.15	159.33	149.14	127.97	99.13
1,550.00	192.87	170.65	161.01	163.03	142.17	96.66
1,800.00	118.89	97.37	77.97	70.03	55.60	48.32
2,000.00	90.69	69.86	51.33	44.04	30.72	24.48
2,500.00	69.59	49.11	31.01	24.06	11.29	5.57
4,000.00	-66.00	-66.00	-66.00	-66.00	-66.00	-66.00
6,000.00	-72.60	-72.60	-72.60	-72.60	-72.60	-72.60
6,400.00	-79.20	-79.20	-79.20	-79.20	-79.20	-79.20

## Initial Supporting table - 1st\_FireAftrMisfr\_Acel

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.81	2.04	1.21	1.89	0.85	0.74	0.68	1.08	1.10	0.94	0.85	0.80	0.71	0.82	0.70	0.50	0.50
8	1.35	1.70	1.13	2.06	1.12	0.81	0.75	0.91	0.98	0.86	0.94	0.80	0.78	0.94	0.75	0.50	0.55
12	0.84	1.07	0.99	1.90	0.84	0.77	0.58	0.72	0.91	0.83	0.80	0.80	0.69	0.76	0.69	0.53	0.45
16	0.38	0.52	0.79	1.38	0.69	0.63	0.43	0.48	0.70	0.62	0.61	0.59	0.53	0.52	0.50	0.47	0.42
20	0.09	0.20	0.63	1.07	0.60	0.54	0.34	0.33	0.53	0.49	0.50	0.43	0.38	0.39	0.36	0.33	0.27
24	-0.05	-0.02	0.48	0.87	0.54	0.48	0.27	0.24	0.43	0.41	0.43	0.33	0.29	0.30	0.26	0.27	0.22
30	-0.31	-0.23	0.34	0.67	0.48	0.42	0.20	0.14	0.33	0.33	0.36	0.25	0.22	0.20	0.18	0.19	0.13
40	-0.51	-0.45	0.22	0.47	0.41	0.36	0.13	0.04	0.23	0.25	0.29	0.17	0.15	0.13	0.08	0.08	0.03
60	-0.73	-0.66	0.10	0.26	0.35	0.29	0.06	-0.05	0.13	0.17	0.22	0.09	0.07	0.04	-0.01	-0.02	-0.04

## Initial Supporting table - 1st\_FireAftrMisfr\_Jerk

**Description:** Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	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
8	0.00	0.00	0.00	0.00	-0.84	-0.83	-0.90	-0.82	-0.93	-0.79	-0.92	-0.70	-0.74	-0.77	-0.70	-0.69	-0.69
12	-0.15	-0.16	0.00	-0.40	-1.19	-1.10	-1.20	-1.05	-1.15	-1.00	-1.27	-1.26	-1.22	-1.14	-1.20	-1.00	-1.08
16	-0.38	-0.40	-0.04	-0.79	-1.18	-1.17	-1.18	-1.07	-1.12	-1.00	-1.19	-1.25	-1.33	-1.19	-1.31	-1.09	-1.25
20	-0.52	-0.55	-0.32	-0.95	-1.18	-1.20	-1.16	-1.09	-1.10	-1.00	-1.15	-1.28	-1.32	-1.24	-1.34	-1.22	-1.25
24	-0.62	-0.64	-0.48	-1.04	-1.18	-1.22	-1.16	-1.10	-1.09	-1.00	-1.13	-1.26	-1.37	-1.30	-1.36	-1.25	-1.39
30	-0.72	-0.74	-0.64	-1.12	-1.18	-1.24	-1.15	-1.10	-1.08	-1.00	-1.10	-1.24	-1.38	-1.32	-1.39	-1.33	-1.45
40	-0.82	-0.83	-0.78	-1.20	-1.18	-1.26	-1.14	-1.11	-1.08	-1.00	-1.07	-1.22	-1.35	-1.32	-1.38	-1.35	-1.44
60	-0.92	-0.93	-0.91	-1.27	-1.17	-1.29	-1.13	-1.12	-1.06	-1.00	-1.04	-1.20	-1.32	-1.30	-1.35	-1.36	-1.49

## Initial Supporting table - 1stFireAfterMisJerkAFM

**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

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1	1	1	1	1	1	1	1	1
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

## Initial Supporting table - 1stFireAfrMisAcelAFM

**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

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

## 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)

y/x	0	1	2	3	4	5	6	7	8
1	4	3	3	2	2	2	2	2	2

**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)

y/x	0	1	2	3	4	5	6	7	8
1	4.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00

**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)

y/x	0	1	2	3	4	5	6	7	8
1	4	3	3	2	2	2	2	2	2



## Initial Supporting table - Bank\_SCD\_Decel

**Description:** Used for P0300 - P0308, Multplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

## Initial Supporting table - Bank\_SCD\_Jerk

**Description:** Used for P0300 - P0308, Multplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - BankCylModeDecel

**Description:** Used for P0300 - P0308, Multplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

## Initial Supporting table - BankCylModeJerk

**Description:** Used for P0300 - P0308, Multplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

## Initial Supporting table - Catalyst\_Damage\_Misfire\_Percentage

**Description:** Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	22.4	22.4	22.4	20.0	16.0	12.0	12.0	12.0
10	22.4	22.4	22.4	20.0	16.0	12.0	12.0	12.0
20	21.0	21.0	20.0	16.0	13.0	11.0	11.0	11.0
30	20.0	20.0	16.0	14.0	11.0	9.0	9.0	9.0
40	17.0	15.0	8.0	8.0	8.0	7.0	7.0	7.0
50	15.0	10.0	7.0	7.0	7.0	4.6	4.6	4.6
60	12.0	7.0	4.6	4.6	4.6	4.6	4.6	4.6
70	12.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	10.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	9.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	9.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6

## Initial Supporting table - ClyAfterAFM\_Decel

**Description:** Used for P0300 - P0308, Multiplier to Lores decel to account for different pattern of misfire after a deactivated cylinder. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - ClyBeforeAFM\_Jerk

**Description:** Used for P0300 - P0308, Multiplier to Lores decel to account for different pattern of misfire before a deactivated cylinder, but after an active cylinder that follows an inactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - CombustModelIdleTbl

**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.

## CombustModelIdleTbl - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

## CombustModelIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

## CombustModelIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	



## Initial Supporting table - ConsecCylModDecel

**Description:** Used for P0300 - P0308, Multplier 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.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.27	1.29	0.94	0.90	1.12	1.56	0.61	0.65	0.82	0.65	0.75	0.84	0.77	0.77	0.65	0.56	0.64
8	1.18	1.25	0.98	0.88	0.66	1.36	0.67	0.60	0.82	0.67	0.77	0.91	0.89	1.00	0.69	0.63	0.82
12	1.31	1.15	0.87	0.79	0.48	0.72	0.63	0.50	0.73	0.69	0.62	0.95	0.93	0.86	0.81	0.73	0.91
16	1.42	0.97	0.67	0.68	0.51	0.53	0.55	0.41	0.56	0.58	0.45	0.76	0.82	0.72	0.85	0.87	0.92
20	1.51	0.96	0.64	0.71	0.59	0.55	0.52	0.46	0.46	0.48	0.48	0.61	0.78	0.78	0.88	0.94	0.87
24	1.59	1.09	0.86	0.78	0.69	0.65	0.57	0.52	0.46	0.43	0.49	0.51	0.77	0.81	0.90	0.95	0.89
30	1.71	1.32	1.12	0.97	0.78	0.75	0.66	0.58	0.54	0.55	0.50	0.53	0.77	0.85	0.92	1.00	0.91
40	1.87	1.59	1.40	1.16	0.88	0.85	0.75	0.65	0.62	0.66	0.63	0.63	0.78	0.88	0.94	1.03	0.94
60	2.08	1.88	1.68	1.34	0.98	0.95	0.84	0.72	0.69	0.76	0.75	0.72	0.78	0.91	0.95	1.07	0.94

## Initial Supporting table - ConsecCylModeJerk

**Description:** Used for P0300 - P0308, Multplier 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.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
8	0	-1	-2	-2	-2	-1	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-2	-2	-3	-1	-1	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1
16	0	-1	-2	-2	-3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
20	0	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
24	0	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
30	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
40	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
60	1	1	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0

## Initial Supporting table - ConsecSCD\_Decel

**Description:** Used for P0300 - P0308, Multplier 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.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - ConsecSCD\_Jerk

**Description:** Used for P0300 - P0308, Multplier 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.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - CylAfterAFM\_Jerk

**Description:** Used for P0300 - P0308, Multiplier to Lores Jerk to account for different pattern of misfire after a deactivated cylinder. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1	1	1	1	1	1	1	1	1
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

## Initial Supporting table - CylBeforeAFM\_Decel

**Description:** Used for P0300 - P0308, Multiplier to LoRes decel to account for different pattern of misfire before a deactivated cylinder, but after an active cylinder that follows an inactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - CylModeDecel

**Description:** Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

## CylModeDecel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	6,475	4,571	2,783	1,801	1,293	983	734	587	471	351	290	249	146
6	6,938	5,082	3,004	1,886	1,327	892	701	529	433	354	252	236	126
8	7,231	5,375	3,197	1,950	1,347	886	704	520	426	356	258	229	126
10	7,524	5,667	3,357	2,005	1,366	974	746	566	444	358	302	231	153
12	7,817	5,959	3,516	2,133	1,481	1,114	797	617	504	392	339	243	181
14	8,110	6,251	3,675	2,250	1,623	1,243	916	721	575	430	376	284	209
16	8,403	6,544	3,835	2,408	1,766	1,372	1,035	824	646	468	418	325	237
18	8,696	6,836	3,994	2,567	1,909	1,501	1,154	928	717	505	461	366	265
20	8,988	7,128	4,153	2,725	2,051	1,629	1,273	1,032	797	562	516	407	293
22	9,281	7,421	4,313	2,883	2,194	1,758	1,392	1,136	884	633	570	448	321
24	9,574	7,713	4,472	3,042	2,336	1,887	1,511	1,240	972	704	624	489	349
26	9,867	8,005	4,631	3,200	2,479	2,016	1,630	1,344	1,059	774	679	530	377
30	10,453	8,590	4,950	3,517	2,764	2,273	1,869	1,552	1,234	916	787	613	433
40	11,917	10,052	5,746	4,309	3,476	2,917	2,464	2,071	1,670	1,269	1,059	818	573
60	14,845	12,975	7,340	5,893	4,902	4,205	3,655	3,110	2,543	1,977	1,602	1,229	853
78	17,408	15,532	8,734	7,280	6,149	5,331	4,698	4,020	3,307	2,595	2,078	1,588	1,097
97	19,970	18,090	10,128	8,625	7,396	6,458	5,740	4,929	4,071	3,214	2,566	1,948	1,342

## CylModeDecel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
3	117	85	66	50	40	34	23	16	11	10	9	7	6
6	117	90	68	53	43	33	23	14	9	9	9	6	5
8	118	97	69	55	44	33	22	14	9	8	8	6	5
10	118	104	70	56	45	33	22	14	9	8	8	6	5
12	132	121	78	58	47	40	22	15	11	8	8	6	5
14	151	137	91	64	55	46	25	17	13	9	7	6	5
16	170	153	105	74	63	53	29	19	15	10	8	6	5
18	190	170	118	84	72	60	34	22	16	12	9	7	6
20	209	186	131	95	80	67	39	25	18	13	9	8	7
22	228	202	144	105	88	74	44	28	20	14	10	9	7
24	248	219	157	115	96	81	48	31	22	16	11	9	8
26	267	235	170	126	104	88	53	34	24	17	12	10	9
30	306	268	197	147	121	102	63	40	27	20	14	12	11
40	402	349	263	198	161	137	86	54	36	27	19	16	14

## 21OBDG03D ECM Supporting Tables

Initial Supporting table - CylModeDecel

60	596	513	394	302	243	206	134	83	55	41	28	24	22
78	765	656	510	393	315	267	175	108	70	53	35	31	28
97	934	799	625	484	386	328	216	133	86	65	43	39	35



## Initial Supporting table - CylModeJerk

**Description:** Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

## CylModeJerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	7,159	4,163	2,943	1,762	1,183	834	683	505	418	300	256	230	152
6	7,940	5,053	3,472	2,224	1,528	1,027	734	537	457	329	256	240	151
8	8,386	5,557	3,774	2,488	1,725	1,137	832	607	494	365	292	246	158
10	8,832	6,060	4,077	2,752	1,922	1,247	964	693	561	429	335	252	168
12	9,278	6,564	4,475	3,016	2,119	1,384	1,141	833	663	494	389	268	192
14	9,725	7,067	4,824	3,283	2,285	1,610	1,318	973	766	558	448	289	231
16	10,171	7,571	5,257	3,646	2,568	1,837	1,495	1,114	873	632	525	349	270
18	10,617	8,074	5,691	4,009	2,851	2,063	1,672	1,254	982	711	602	409	308
20	11,064	8,578	6,124	4,371	3,133	2,289	1,849	1,394	1,103	811	679	470	347
22	11,510	9,082	6,558	4,734	3,416	2,515	2,026	1,535	1,223	912	756	530	386
24	11,956	9,585	6,992	5,097	3,699	2,741	2,203	1,675	1,344	1,013	832	590	425
26	12,403	10,089	7,425	5,460	3,982	2,968	2,379	1,815	1,465	1,114	909	650	463
30	13,295	11,096	8,292	6,185	4,548	3,420	2,733	2,096	1,706	1,316	1,063	771	541
40	15,527	13,614	10,461	7,999	5,962	4,551	3,618	2,797	2,309	1,821	1,447	1,072	735
60	20,000	18,563	14,797	11,626	8,791	6,812	5,387	4,200	3,515	2,830	2,215	1,674	1,126
78	20,000	20,000	18,591	14,800	11,267	8,791	6,934	5,428	4,570	3,713	2,886	2,202	1,475
97	20,000	20,000	20,000	17,973	13,742	10,770	8,482	6,655	5,625	4,596	3,558	2,729	1,824

## CylModeJerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
3	108	80	69	50	40	35	25	20	15	13	9	7	6
6	107	79	60	50	39	36	25	18	13	10	8	7	6
8	106	84	62	51	43	36	25	18	13	10	8	7	6
10	121	93	70	57	49	36	25	18	13	10	8	7	6
12	149	106	85	68	58	42	25	18	14	10	9	7	6
14	177	125	100	79	67	49	31	20	16	11	10	7	7
16	205	144	115	90	76	57	36	23	19	13	12	8	8
18	232	164	129	101	85	64	41	26	21	15	13	9	8
20	260	183	144	112	94	71	46	30	23	16	14	10	9
22	288	202	159	122	103	79	51	33	25	18	15	11	10
24	316	221	174	133	112	86	56	36	27	20	16	12	11
26	344	240	189	144	121	93	61	39	30	21	18	13	12
30	399	278	218	166	139	108	72	46	34	25	20	15	13
40	538	373	292	220	183	145	97	62	45	33	26	20	17

Initial Supporting table - CylModeJerk

60	816	564	440	329	273	218	149	94	68	50	38	29	25
78	1,059	731	570	425	352	282	194	122	87	64	49	37	32
97	1,302	898	699	520	430	346	239	150	107	79	59	46	39

## 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.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

## Initial Supporting table - DeacCylInversionJerk

**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.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

## Initial Supporting table - EngineOverSpeedLimit

**Description:** Engine OverSpeed Limit versus gear**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	6,200	6,200	6,200	6,200	6,200	6,200	6,200

**EngineOverSpeedLimit - Part 2**

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeutral	CeTGRR_e_TransGrReverse	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	6,200	4,000	4,000	4,000	6,200	6,200	

## Initial Supporting table - InfrequentRegen

**Description:** Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matches a selection in the table. A value of CeCMBR\_i\_CombModesMax means not selected.

## InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

## InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

## InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	

## 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.

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

## 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	-40	-32	-24	-16	-8	0	0	8	16	24	32	40	48	64	80	96	112
1	11.0	11.0	10.0	9.0	8.0	5.0	5.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0



## Supporting table - P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD\_p\_HPS\_PressFallLoThrsh after High Pressure Start

**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	-40	-32	-24	-16	-8	0	0	8	16	24	32	40	48	64	80	96	112
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	-40	-32	-24	-16	-8	0	0	8	16	24	32	40	48	64	80	96	112
0	2.0	2.0	2.0	2.0	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	0.9	0.6	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	-40	-32	-24	-16	-8	0	0	8	16	24	32	40	48	64	80	96	112
0	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
13	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
25	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
38	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
50	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
63	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
75	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
88	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
100	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5

## 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 for that 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	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50
450.00	0.81	0.77	0.73	0.69	0.65	0.61	0.50	0.44	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.22
500.00	0.83	0.79	0.75	0.71	0.67	0.63	0.52	0.46	0.41	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.24
550.00	0.85	0.81	0.77	0.73	0.69	0.65	0.54	0.48	0.43	0.40	0.38	0.36	0.34	0.32	0.30	0.28	0.26
600.00	0.87	0.83	0.79	0.75	0.71	0.67	0.56	0.50	0.45	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.28
650.00	0.89	0.85	0.81	0.77	0.73	0.69	0.58	0.52	0.47	0.44	0.42	0.40	0.38	0.36	0.34	0.32	0.30
700.00	0.91	0.87	0.83	0.79	0.75	0.71	0.60	0.54	0.49	0.46	0.44	0.42	0.40	0.38	0.36	0.34	0.32
750.00	0.93	0.89	0.85	0.81	0.77	0.73	0.62	0.56	0.51	0.48	0.46	0.44	0.42	0.40	0.38	0.36	0.34
800.00	0.95	0.91	0.87	0.83	0.79	0.75	0.64	0.58	0.53	0.50	0.48	0.46	0.44	0.42	0.40	0.38	0.36
850.00	0.97	0.93	0.89	0.85	0.81	0.77	0.66	0.60	0.55	0.52	0.50	0.48	0.46	0.44	0.42	0.40	0.38

## Initial Supporting table - P0420\_WorstPassingOSCTableB1

**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 in this table are based on the measured OSC for the WPA part across the temp and airflow range.

y/x	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50
450.00	1.19	1.12	1.07	1.02	0.97	0.92	0.80	0.73	0.67	0.63	0.60	0.57	0.54	0.51	0.48	0.45	0.42
500.00	1.21	1.14	1.09	1.04	0.99	0.94	0.82	0.75	0.69	0.65	0.62	0.59	0.56	0.53	0.50	0.47	0.44
550.00	1.23	1.16	1.11	1.06	1.01	0.96	0.84	0.77	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.49	0.46
600.00	1.25	1.18	1.13	1.08	1.03	0.98	0.86	0.79	0.73	0.69	0.66	0.63	0.60	0.57	0.54	0.51	0.48
650.00	1.27	1.20	1.15	1.10	1.05	1.00	0.88	0.81	0.75	0.71	0.68	0.65	0.62	0.59	0.56	0.53	0.50
700.00	1.29	1.22	1.17	1.12	1.07	1.02	0.90	0.83	0.77	0.73	0.70	0.67	0.64	0.61	0.58	0.55	0.52
750.00	1.31	1.24	1.19	1.14	1.09	1.04	0.92	0.85	0.79	0.75	0.72	0.69	0.66	0.63	0.60	0.57	0.54
800.00	1.33	1.26	1.21	1.16	1.11	1.06	0.94	0.87	0.81	0.77	0.74	0.71	0.68	0.65	0.62	0.59	0.56
850.00	1.35	1.28	1.23	1.18	1.13	1.08	0.96	0.89	0.83	0.79	0.76	0.73	0.70	0.67	0.64	0.61	0.58

## Initial Supporting table - Pair\_SCD\_Decel

**Description:** Used for P0300 - P0308, Multplier to SCD\_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

## Initial Supporting table - Pair\_SCD\_Jerk

**Description:** Used for P0300 - P0308, Multplier to P0300\_SCD\_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - PairCylModeDecel

**Description:** Used for P0300 - P0308, Multplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	0.93	0.87	0.87	0.60	0.52	0.56	0.59	0.60	0.56	0.59	0.67	0.55	0.68	0.60	0.56	0.64
8	1.09	0.88	0.85	0.64	0.65	0.67	0.51	0.52	0.58	0.56	0.60	0.48	0.48	0.71	0.50	0.50	0.73
12	1.05	1.04	0.98	0.83	0.79	0.73	0.67	0.57	0.62	0.61	0.59	0.66	0.66	0.71	0.63	0.53	0.73
16	1.10	1.10	0.96	1.06	0.81	0.84	0.81	0.66	0.67	0.71	0.58	0.76	0.76	0.69	0.75	0.80	0.75
20	1.16	1.14	1.04	1.19	0.86	0.90	0.89	0.73	0.73	0.77	0.66	0.77	0.78	0.75	0.80	0.89	0.80
24	1.20	1.17	1.09	1.19	0.91	0.95	0.95	0.77	0.78	0.80	0.72	0.77	0.81	0.77	0.81	0.91	0.83
30	1.24	1.20	1.15	1.19	0.96	0.99	1.01	0.82	0.82	0.84	0.78	0.78	0.82	0.78	0.85	0.93	0.87
40	1.29	1.24	1.20	1.20	1.01	1.04	1.08	0.87	0.86	0.87	0.83	0.78	0.84	0.81	0.89	0.95	0.94
60	1.33	1.28	1.26	1.20	1.06	1.09	1.14	0.93	0.91	0.91	0.89	0.79	0.86	0.82	0.91	0.98	0.94



## Initial Supporting table - PairCylModeJerk

**Description:** Used for P0300 - P0308, Multplier to P0300\_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.55	1.56	1.57	1.61	1.31	1.00	1.00	1.10	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.24	1.14	1.28	1.33	1.14	1.06	1.19	1.23	1.19	1.17	1.08	1.00	1.00	1.00	1.00	1.00	1.00
12	1.31	1.37	1.23	1.39	1.46	1.40	1.31	1.33	1.28	1.21	1.31	1.02	1.19	1.04	1.05	1.00	1.08
16	1.40	1.51	1.14	1.62	1.76	1.56	1.33	1.34	1.28	1.16	1.36	1.15	1.30	1.14	1.15	1.00	1.06
20	1.45	1.56	1.30	1.68	1.79	1.65	1.43	1.44	1.38	1.25	1.43	1.23	1.36	1.22	1.25	1.15	1.15
24	1.54	1.58	1.44	1.68	1.80	1.71	1.50	1.51	1.44	1.34	1.47	1.29	1.39	1.26	1.26	1.22	1.30
30	1.54	1.61	1.57	1.68	1.82	1.76	1.56	1.57	1.49	1.42	1.51	1.34	1.42	1.29	1.31	1.25	1.38
40	1.54	1.65	1.71	1.68	1.83	1.81	1.63	1.64	1.55	1.51	1.55	1.38	1.45	1.34	1.34	1.35	1.44
60	1.54	1.68	1.85	1.68	1.84	1.86	1.69	1.70	1.61	1.59	1.59	1.43	1.48	1.39	1.36	1.42	1.56

## Initial Supporting table - Random\_SCD\_Decel

**Description:** Used for P0300 - P0308, Multplier to SCD\_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - Random\_SCD\_Jerk

**Description:** Used for P0300 - P0308, Multplier to Random\_SCD\_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - RandomAFM\_Decl

**Description:** Used for P0300 - P0308, Multiplier to Cylinder\_Decel while in Cylinder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## Initial Supporting table - RandomAFM\_Jerk

**Description:** Used for P0300 - P0308, Multplier to 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.

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

## 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.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.30	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.21	1.42	1.20	1.30	1.25	1.47	1.06	1.07	1.09	1.17	1.40	1.09	1.22	1.47	1.19	1.00	1.09
12	1.47	1.83	1.40	1.40	1.40	1.40	1.40	1.18	1.45	1.61	1.58	1.70	1.72	1.62	1.69	1.33	1.36
16	1.71	2.07	1.60	1.50	1.50	1.46	1.49	1.26	1.50	1.65	1.57	1.81	1.74	1.48	1.80	1.80	1.75
20	1.91	2.26	1.70	1.70	1.61	1.53	1.54	1.33	1.54	1.62	1.60	1.74	1.66	1.56	1.80	1.83	1.73
24	2.08	2.41	1.73	1.55	1.60	1.57	1.58	1.38	1.55	1.66	1.62	1.71	1.71	1.63	1.77	1.86	1.78
30	2.30	2.57	1.84	1.58	1.60	1.62	1.62	1.42	1.58	1.69	1.63	1.67	1.76	1.72	1.82	1.96	1.83
40	2.59	2.76	1.96	1.61	1.59	1.66	1.66	1.48	1.60	1.73	1.66	1.65	1.79	1.79	1.85	1.97	1.94
60	2.97	2.96	2.08	1.64	1.59	1.71	1.70	1.53	1.62	1.76	1.67	1.63	1.83	1.86	1.86	2.05	1.98

## 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.

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	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
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

## Initial Supporting table - RandomRevModDecI

**Description:** Used for P0300 - P0308, Multitplier to RevMode\_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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



**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.

y/x	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	1.00	1.00	1.00	1.11	1.11	1.25	1.25	1.25	1.25

## Initial Supporting table - RevMode\_Decel

**Description:** Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

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.

y/x	0	1	2	3	4	5	6	7	8
1	4	4	4	4	4	4	4	4	4

## Initial Supporting table - SCD\_Decel

**Description:** Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

## 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.

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

## Initial Supporting table - SnapDecayAfterMisfire

**Description:** Used for P0300 - P0308, multiplier times the ddt\_jerk 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.

y/x	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	1.10	1.00	1.00	0.90	0.90	0.80	0.80	0.80	0.80
1	1.10	1.00	1.00	1.00	0.90	0.90	0.80	0.80	0.80
1	1.10	1.00	1.00	1.00	1.00	0.90	0.90	0.80	0.80
1	1.10	1.10	1.00	1.00	1.00	1.00	0.90	0.90	0.80
2	1.10	1.10	1.10	1.10	1.00	1.00	1.00	0.90	0.90
2	1.10	1.10	1.30	1.20	1.20	1.10	1.00	1.00	0.90
3	1.20	1.20	1.40	1.30	1.30	1.10	1.00	1.00	1.00
3	1.40	1.40	2.20	1.30	1.20	1.10	1.00	1.00	1.00
5	1.40	1.40	1.60	1.20	1.10	1.00	1.00	1.00	1.00

## 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

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	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

**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.

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

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.55005	0.57996	0.60999	0.69995	0.90002	1.09998	1.34998	1.34998	0.79004	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005

## 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

## ZeroTorqueAFM - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
65	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30	-0.15	0.10	0.25	0.40	0.70	1.00	1.40
75	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	0.10	0.30	0.32	0.50	1.00	1.40	2.00
85	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	0.30	0.40	0.60	0.90	1.10	1.40	2.00
95	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	0.30	0.40	0.60	0.90	1.10	1.40	2.00
105	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	0.30	0.40	0.60	0.90	1.10	1.40	2.00

## ZeroTorqueAFM - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
65	1.80	1.60	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
75	1.80	1.60	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
85	1.80	1.60	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
95	1.80	1.60	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
105	1.80	1.60	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44

## 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

## ZeroTorqueEngLoad - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
65	-2.60	-2.60	-2.60	-2.60	-2.60	-2.60	-2.27	-1.94	-1.61	-1.28	-0.95	-0.62	0.00
75	-2.60	-2.60	-2.60	-2.60	-2.60	-2.60	-2.27	-1.94	-1.61	-1.28	-0.95	-0.62	0.00
85	-2.60	-2.60	-2.60	-2.60	-2.60	-2.60	-2.27	-1.94	-1.61	-1.28	-0.95	-0.62	0.00
95	-2.60	-2.60	-2.60	-2.60	-2.60	-2.60	-2.27	-1.94	-1.61	-1.28	-0.95	-0.62	0.00
105	-2.60	-2.60	-2.60	-2.60	-2.60	-2.60	-2.27	-1.94	-1.61	-1.28	-0.95	-0.62	0.00

## ZeroTorqueEngLoad - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
65	0.40	0.30	0.15	0.15	0.40	0.70	1.75	2.80	3.85	4.90	5.95	7.00	8.05
75	0.25	0.25	0.25	0.30	0.55	0.90	1.95	3.00	4.05	5.10	6.15	7.20	8.25
85	0.50	0.60	0.50	0.50	0.70	1.10	2.15	3.20	4.25	5.30	6.35	7.40	8.45
95	0.60	1.00	0.90	0.90	1.00	1.30	2.35	3.40	4.45	5.50	6.55	7.60	8.65
105	0.70	1.10	1.00	1.20	1.30	1.50	2.55	3.60	4.65	5.70	6.75	7.80	8.85

**Initial Supporting table - Closed Loop Enable Clarification - KaFCLP\_U\_SlphrIntglOfst\_Thrsh**

**Description:** Integral Offset voltage thresholds (bank and cell specific calcs) 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	2,048	2,048
CiFCLP_Idle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

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 - KeEOSD\_U\_RichThrsh

**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 O2 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	255

**Initial Supporting table - Closed Loop Enable Clarification - KeFCLP\_T\_IntegrationCatalystMax****Description:** Maximum allowed estimated catalytic converter temperature for post O2 integral terms to be updated.**Value Units:** Celcius

y/x	1
1	950

**Initial Supporting table - Closed Loop Enable Clarification - KeFCLP\_T\_IntegrationCatalystMin**

**Description:** Minimum allowed estimated catalytic converter temperature to begin using post O2 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post O2 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post O2 integration will not be allowed below this converter temperature

**Value Units:** Celcius

y/x	1
1	450

**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	650

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC\_T\_HtrCntrlCL

**Description:** WRAF heater temperature enabling threshold for transition 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	50

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	1,100

**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	409.0	409.0	409.0	409.0	409.0	50.0	50.0	50.0	50.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0

## Initial Supporting table - Closed Loop Enable Clarification - KtFCLP\_t\_PostIntglRamplnTime

**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	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	5.0

## 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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

## 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	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

### 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	20	20	20	30	50	80	120	170	210	210	210	210	210	210	210	210	210

**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 EONV 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	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
2	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
3	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
4	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
5	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
6	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
7	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
8	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
9	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
10	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
11	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
12	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
13	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
14	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
15	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
16	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
17	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5

**Initial Supporting table - P2B85 26CE Pump Speed Performance Initialization Delay****Description:** Pump speed performance initialization delay as function of command speed and engine inlet coolant temperature**Value Units:** Pump initialization delay (s)**X Unit:** Engine inlet coolant temperature (Deg C)**Y Units:** Commanded pump speed (RPM)

y/x	-40	0	40
1,000	5	5	5
4,000	5	5	5
6,000	5	5	5

Initial Supporting table - P057B KtBRKI\_K\_CmpltTestPointWeight

Description:

y/x	0.000	0.001	0.011	0.028	0.045	0.055	0.091	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - P057B KtBRKI\_K\_FastTestPointWeight

Description:

y/x	0.000	0.001	0.011	0.028	0.045	0.055	0.091	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - DFCO\_CoolEnbIHi\_Temp

Description:			
y/x	-40	0	25
1	30.0	25.0	20.0

## Initial Supporting table - DFCO\_DelayAfterStart\_Time

## Description:

y/x	-30	-10	20	60	90
1	20.0	15.0	10.0	8.0	5.0

## Initial Supporting table - DFCO\_DsbILo\_Vehicle\_Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	29	29
CeTGRR_e_TransGr2	21	21
CeTGRR_e_TransGr3	18	18
CeTGRR_e_TransGr4	17	17
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	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	32.0	32.0
CeTGRR_e_TransGr2	24.0	24.0
CeTGRR_e_TransGr3	23.0	23.0
CeTGRR_e_TransGr4	23.0	23.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGr9	0.0	0.0
CeTGRR_e_TransGr10	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	512.0	512.0
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	-1,000	-750	-500	-300	-100	0
1	500	400	250	150	100	50	0	0	0

## Initial Supporting table - CalculatedPerfMaxEc1

**Description:** Maximum desired camshaft position for Exhaust CAM - Bank1

**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 92 104 116 128 140 152]

**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	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
2	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
3	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
4	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
5	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
7	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
8	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
9	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
10	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
11	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
12	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
13	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
14	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
15	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
16	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
17	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0

## Initial Supporting table - CalculatedPerfMaxIc1

**Description:** Maximum desired camshaft position for Intake CAM - Bank1

**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 92 104 116 128 140 152]

**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	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
2	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
3	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
4	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
5	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
7	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
8	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
9	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
10	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
11	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
12	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
13	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
14	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
15	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
16	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
17	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0

## 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:** PowerUp 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:** PowerUp 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 - 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 I.D. (no units) (Only PurgeOff cells are used)

## Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1

y/x	CeFADR_e_Cell00_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_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	250	65,535	65,535	65,535

## Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	65,535	65,535	100	100

## 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\_NonSelectedCell" are not used for diagnosis.

## P0171\_P0172\_P0174\_P0175 Long-Term Fuel Trim Cell Usage - Part 1

y/x	CeFADR_e_Cell00_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_SelectedPurgeCell	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_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell

## 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_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

## Initial Supporting table - Startup Engine Coolant adjustment 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	194	194	152	110	0	0	0	0	0	0	0	0	0	0	0	0	0



**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	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	14.70	20.66	25.20	48.42	255.00	255.00	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	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	33.29	36.01	32.32	35.95	255.00	255.00	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	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

**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	511.99	511.99	511.99	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

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	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

## 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	1,000.000	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	3	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 - P16F3\_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	32.32	32.32	32.32	32.32	32.32	32.32

## Initial Supporting table - P16F3\_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 Table for 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
350.00	148.50	129.83	127.50	135.50	117.00	67.50
450.00	148.50	129.83	127.50	135.50	117.00	67.50
550.00	148.50	129.83	127.50	135.50	117.00	67.50
650.00	148.50	129.83	127.50	135.50	117.00	67.50
750.00	148.50	129.83	127.50	135.50	117.00	67.50
850.00	156.02	136.02	134.44	139.24	120.10	73.51
900.00	160.78	139.12	138.45	139.20	119.73	77.52
1,100.00	170.53	142.20	146.42	137.28	117.27	86.15
1,200.00	183.57	145.29	155.64	139.01	118.29	94.78
1,300.00	191.74	151.15	159.33	149.14	127.97	99.13
1,550.00	192.87	170.65	161.01	163.03	142.17	96.66
1,800.00	118.89	97.37	77.97	70.03	55.60	48.32
2,000.00	90.69	69.86	51.33	44.04	30.72	24.48
2,500.00	69.59	49.11	31.01	24.06	11.29	5.57
4,000.00	-66.00	-66.00	-66.00	-66.00	-66.00	-66.00
6,000.00	-72.60	-72.60	-72.60	-72.60	-72.60	-72.60
6,400.00	-79.20	-79.20	-79.20	-79.20	-79.20	-79.20

## 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	1,000.000	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	3	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 - P16F3\_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	32.32	32.32	32.32	32.32	32.32	32.32

## Initial Supporting table - P16F3\_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 Table for 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
350.00	148.50	129.83	127.50	135.50	117.00	67.50
450.00	148.50	129.83	127.50	135.50	117.00	67.50
550.00	148.50	129.83	127.50	135.50	117.00	67.50
650.00	148.50	129.83	127.50	135.50	117.00	67.50
750.00	148.50	129.83	127.50	135.50	117.00	67.50
850.00	156.02	136.02	134.44	139.24	120.10	73.51
900.00	160.78	139.12	138.45	139.20	119.73	77.52
1,100.00	170.53	142.20	146.42	137.28	117.27	86.15
1,200.00	183.57	145.29	155.64	139.01	118.29	94.78
1,300.00	191.74	151.15	159.33	149.14	127.97	99.13
1,550.00	192.87	170.65	161.01	163.03	142.17	96.66
1,800.00	118.89	97.37	77.97	70.03	55.60	48.32
2,000.00	90.69	69.86	51.33	44.04	30.72	24.48
2,500.00	69.59	49.11	31.01	24.06	11.29	5.57
4,000.00	-66.00	-66.00	-66.00	-66.00	-66.00	-66.00
6,000.00	-72.60	-72.60	-72.60	-72.60	-72.60	-72.60
6,400.00	-79.20	-79.20	-79.20	-79.20	-79.20	-79.20



**Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case****Description:** Value to normalize the Crankcase Pressure signal noise based on engine speed, high case**Value Units:** Scaling Factor for Noise (Unitless)**X Unit:** Engine Speed (RPM)**Y Units:** None

y/x	500	800	1,100	1,400	1,700	2,000	2,300	2,600	2,700
1	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00

**Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case****Description:** Value to normalize the Crankcase Pressure signal noise based on engine speed, low case**Value Units:** Scaling Factor for Noise (Unitless)**X Unit:** Engine Speed (RPM)**Y Units:** None

y/x	500	800	1,100	1,400	1,700	2,000	2,300	2,600	2,700
1	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00

**Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case****Description:** Value to normalize the Crankcase Pressure signal based on engine air flow, low case**Value Units:** Scaling Factor for Signal (Unitless)**X Unit:** Engine Air Flow (Grams/Second)**Y Units:** None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case****Description:** Value to normalize the Crankcase Pressure signal based on engine air flow, low case**Value Units:** Scaling Factor for Signal (Unitless)**X Unit:** Engine Air Flow (Grams/Second)**Y Units:** None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**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	680	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	0.246	0.270	0.270	0.289	0.279	0.320	0.400	0.471	0.529	0.680	0.850	1.189	1.199	1.400	1.600	1.801	2.000

## 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	680	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	0.000	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 - 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	-600.0	-600.0	-600.0	-600.0	-600.0
2,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
3,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
4,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
5,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
6,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
7,000.0	-600.0	-600.0	-600.0	-600.0	-600.0

## Initial Supporting table - P129F 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	600.0	600.0	600.0	600.0	600.0
2,000.0	600.0	600.0	600.0	600.0	600.0
3,000.0	600.0	600.0	600.0	600.0	600.0
4,000.0	600.0	600.0	600.0	600.0	600.0
5,000.0	600.0	600.0	600.0	600.0	600.0
6,000.0	600.0	600.0	600.0	600.0	600.0
7,000.0	1,575.0	1,575.0	1,575.0	1,575.0	1,575.0



## Initial Supporting table - P2635 Max Fuel Flow

**Description:** P2635 Maximum Fuel Flow Disable Criteria  
Maximum allowed fuel flow values above which the diagnostic is disabled

**Value Units:** grams / second  
**X Unit:** kilopascals [commanded fuel pressure]  
**Y Units:** volts [device supply]

y/x	200	250	300	350	400	450	500	550	600
5	512	512	512	512	512	512	512	512	512
6	512	512	512	512	512	512	512	512	512
8	512	512	512	512	512	512	512	512	512
9	512	512	512	512	512	512	512	512	512
11	512	512	512	512	512	512	512	512	512
12	512	512	512	512	512	512	512	512	512
14	512	512	512	512	512	512	512	512	512
15	512	512	512	512	512	512	512	512	512
17	512	512	512	512	512	512	512	512	512
18	512	512	512	512	512	512	512	512	512
20	512	512	512	512	512	512	512	512	512
21	512	512	512	512	512	512	512	512	512
23	512	512	512	512	512	512	512	512	512
24	512	512	512	512	512	512	512	512	512
26	512	512	512	512	512	512	512	512	512
27	512	512	512	512	512	512	512	512	512
29	512	512	512	512	512	512	512	512	512

## Initial Supporting table - P2635 Threshold High

**Description:** P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump]  
Instantaneously calculated filtered fuel pressure error

**Value Units:** kilopascals

**X Unit:** kilopascals [commanded fuel pressure]

**Y Units:** grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	30	38	45	53	60	68	75	83	90
2	30	38	45	53	60	68	75	83	90
3	30	38	45	53	60	68	75	83	90
5	30	38	45	53	60	68	75	83	90
6	30	38	45	53	60	68	75	83	90
8	30	38	45	53	60	68	75	83	90
9	30	38	45	53	60	68	75	83	90
11	30	38	45	53	60	68	75	83	90
12	30	38	45	53	60	68	75	83	90
14	30	38	45	53	60	68	75	83	90
15	30	38	45	53	60	68	75	83	90
17	30	38	45	53	60	68	75	83	90
18	30	38	45	53	60	68	75	83	90
20	30	38	45	53	60	68	75	83	90
21	30	38	45	53	60	68	75	83	90
23	30	38	45	53	60	68	75	83	90
24	30	38	45	53	60	68	75	83	90
26	30	38	45	53	60	68	75	83	90
27	30	38	45	53	60	68	75	83	90
29	30	38	45	53	60	68	75	83	90
30	30	38	45	53	60	68	75	83	90
32	30	38	45	53	60	68	75	83	90
33	30	38	45	53	60	68	75	83	90
35	30	38	45	53	60	68	75	83	90
36	30	38	45	53	60	68	75	83	90
38	30	38	45	53	60	68	75	83	90
39	30	38	45	53	60	68	75	83	90
41	30	38	45	53	60	68	75	83	90
42	30	38	45	53	60	68	75	83	90
44	30	38	45	53	60	68	75	83	90
45	30	38	45	53	60	68	75	83	90

**Initial Supporting table - P2635 Threshold High**

47	30	38	45	53	60	68	75	83	90
48	30	38	45	53	60	68	75	83	90

## Initial Supporting table - P2635 Threshold Low

**Description:** P2635 Filtered Pressure Error Low Threshold [over-performing pump]  
Instantaneously calculated filtered fuel pressure error

**Value Units:** kilopascals

**X Unit:** kilopascals [commanded fuel pressure]

**Y Units:** grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-260	-210	-160	-110	-60	-68	-75	-83	-90
2	-145	-125	-103	-81	-60	-68	-75	-83	-90
3	-30	-38	-45	-53	-60	-68	-75	-83	-90
5	-30	-38	-45	-53	-60	-68	-75	-83	-90
6	-30	-38	-45	-53	-60	-68	-75	-83	-90
8	-30	-38	-45	-53	-60	-68	-75	-83	-90
9	-30	-38	-45	-53	-60	-68	-75	-83	-90
11	-30	-38	-45	-53	-60	-68	-75	-83	-90
12	-30	-38	-45	-53	-60	-68	-75	-83	-90
14	-30	-38	-45	-53	-60	-68	-75	-83	-90
15	-30	-38	-45	-53	-60	-68	-75	-83	-90
17	-30	-38	-45	-53	-60	-68	-75	-83	-90
18	-30	-38	-45	-53	-60	-68	-75	-83	-90
20	-30	-38	-45	-53	-60	-68	-75	-83	-90
21	-30	-38	-45	-53	-60	-68	-75	-83	-90
23	-30	-38	-45	-53	-60	-68	-75	-83	-90
24	-30	-38	-45	-53	-60	-68	-75	-83	-90
26	-30	-38	-45	-53	-60	-68	-75	-83	-90
27	-30	-38	-45	-53	-60	-68	-75	-83	-90
29	-30	-38	-45	-53	-60	-68	-75	-83	-90
30	-30	-38	-45	-53	-60	-68	-75	-83	-90
32	-30	-38	-45	-53	-60	-68	-75	-83	-90
33	-30	-38	-45	-53	-60	-68	-75	-83	-90
35	-30	-38	-45	-53	-60	-68	-75	-83	-90
36	-30	-38	-45	-53	-60	-68	-75	-83	-90
38	-30	-38	-45	-53	-60	-68	-75	-83	-90
39	-30	-38	-45	-53	-60	-68	-75	-83	-90
41	-30	-38	-45	-53	-60	-68	-75	-83	-90
42	-30	-38	-45	-53	-60	-68	-75	-83	-90
44	-30	-38	-45	-53	-60	-68	-75	-83	-90
45	-30	-38	-45	-53	-60	-68	-75	-83	-90

**Initial Supporting table - P2635 Threshold Low**

47	-30	-38	-45	-53	-60	-68	-75	-83	-90
48	-30	-38	-45	-53	-60	-68	-75	-83	-90

**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	0.75	0.75	0.75	0.75	0.80	0.82	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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	134	106	93	81	74	72	69	67	64	59	55	50	46	42	37	35	33



**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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	883	975	974	969	975	973	976	980	982	984	985	987	990	992	995	996	996

## 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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	134	106	93	81	74	72	69	67	64	59	55	50	46	42	37	35	33

**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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	283	375	374	369	375	373	376	380	382	384	385	387	390	392	395	396	396

Supporting table - 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	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

## 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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	540	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090

**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:** Measured 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	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14
5.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05
10.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
15.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
18.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
19.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
20.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
21.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
22.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04
24.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04
26.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
28.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
30.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
32.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
34.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
35.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
36.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.05

**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	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14
5.00	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
10.00	-0.04	-0.04	-0.05	-0.05	-0.05	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
15.00	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.08	-0.08	-0.09	-0.09	-0.11
18.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
19.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.08	-0.09	-0.09	-0.11
20.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
21.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
22.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.09	-0.09	-0.11
24.00	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.09	-0.09	-0.11
26.00	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.09	-0.09	-0.11

## 21OBDG03D ECM Supporting Tables

**Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit**

28.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
30.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
32.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
34.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
35.00	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
36.00	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.11

**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	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.20	-0.20
5.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
10.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
15.00	-0.14	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
18.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
19.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
20.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
21.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
22.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
24.00	-0.15	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
26.00	-0.15	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
28.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
30.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
32.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
34.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
35.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
36.00	-0.16	-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:** Measured Fuel Rail Pressure (MPa)**Y Units:** Injection Pulse Width (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
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	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
22.00	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
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	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
22.00	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
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20



## 21OBDG03D ECM Supporting Tables

**Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit**

28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	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
22.00	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
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00

00	P2B01	P2B02	P2B03	P2B04	P2B05	P2B06	P2B07	P2B96	P2B08	P2B09	P2B0A	P2B0B	P2B0C	P2B0D	P2B0E	P2B0F	- Opening Magnitude	M
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<b>Description:</b> Opening Magnitude threshold to detect missing injection pulse																	
<b>Value Units:</b> Opening Magnitude Voltage <b>X Unit:</b> Measured Fuel Rail Pressure																	
y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	0.00	109.88	97.19	88.81	79.13	65.81	79.50	70.13	80.19	67.81	70.00	59.00	51.19	53.69	42.38	47.81	47.88

## 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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	540	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090

## 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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	540	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090

## 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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	540	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090

## 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.

## RufCyl\_Decel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	6,475	4,571	2,783	1,801	1,301	1,105	847	577	447	275	175	159	116
4	6,673	4,459	2,877	1,830	1,307	1,081	799	552	431	275	180	175	127
6	6,938	5,082	3,004	1,886	1,327	1,063	760	531	431	279	187	188	136
8	7,231	5,375	3,197	1,950	1,347	1,044	741	570	444	288	230	201	145
10	7,524	5,667	3,357	2,005	1,366	1,060	753	593	467	318	277	223	165
12	7,817	5,959	3,516	2,133	1,481	1,114	813	655	504	353	325	250	181
14	8,110	6,251	3,675	2,250	1,623	1,243	916	721	575	400	372	284	209
16	8,403	6,544	3,835	2,408	1,766	1,372	1,035	824	646	447	418	325	237
18	8,696	6,836	3,994	2,567	1,909	1,501	1,154	928	717	505	469	366	265
20	8,988	7,128	4,153	2,725	2,051	1,629	1,273	1,032	797	562	516	407	293
22	9,281	7,421	4,313	2,883	2,194	1,758	1,392	1,136	884	633	570	448	321
24	9,574	7,713	4,472	3,042	2,336	1,887	1,511	1,240	972	704	624	489	349
26	9,867	8,005	4,631	3,200	2,479	2,016	1,630	1,344	1,059	774	679	530	377
30	10,453	8,590	4,950	3,517	2,764	2,273	1,869	1,552	1,234	916	787	613	433
40	11,917	10,052	5,746	4,309	3,476	2,917	2,464	2,071	1,670	1,269	1,059	818	573
60	14,845	12,975	7,340	5,893	4,902	4,205	3,655	3,110	2,543	1,977	1,602	1,229	853
78	17,408	15,532	8,734	7,280	6,149	5,331	4,698	4,020	3,307	2,595	2,078	1,588	1,097

## RufCyl\_Decel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	117	99	77	56	52	34	23	16	11	10	9	7	6
4	117	99	75	61	53	39	23	15	10	10	9	7	6
6	117	99	75	65	54	43	23	15	10	9	9	6	5
8	117	103	79	70	58	46	24	15	10	8	8	6	5
10	135	110	85	74	62	50	25	15	10	8	8	6	5
12	151	121	91	78	66	54	26	16	11	8	8	6	5
14	171	137	99	83	69	58	27	17	13	9	7	6	5
16	192	153	107	87	73	62	29	19	15	10	8	6	5
18	209	170	118	91	78	66	34	22	16	12	9	7	6
20	229	186	131	96	83	73	39	25	18	13	9	8	7
22	248	202	144	105	88	80	44	28	20	14	10	9	7
24	267	219	157	115	96	87	48	31	22	16	11	9	8
26	286	235	170	126	104	94	53	34	24	17	12	10	9
30	323	268	197	147	121	107	63	40	27	20	14	12	11



Initial Supporting table - RufCyl\_Decel

40	417	349	263	198	161	141	86	54	36	27	19	16	14
60	605	513	394	302	243	209	134	83	55	41	28	24	22
78	769	656	510	393	315	268	175	108	70	53	35	31	28

## Initial Supporting table - RufCyl\_Jerk

**Description:** Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

## RufCyl\_Jerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	7,159	4,163	2,943	1,762	1,183	839	683	450	350	300	225	200	169
4	7,493	4,544	3,169	1,960	1,331	855	683	400	300	200	200	202	146
6	7,940	5,053	3,472	2,224	1,528	876	683	400	350	200	200	200	140
8	8,386	5,557	3,774	2,488	1,725	1,022	800	450	400	250	250	220	143
10	8,832	6,060	4,077	2,752	1,922	1,174	964	550	500	350	335	241	158
12	9,278	6,564	4,475	3,016	2,119	1,384	1,141	750	650	450	389	268	178
14	9,725	7,067	4,824	3,283	2,285	1,610	1,318	950	766	550	448	289	216
16	10,171	7,571	5,257	3,646	2,568	1,837	1,495	1,114	873	632	525	349	270
18	10,617	8,074	5,691	4,009	2,851	2,063	1,672	1,254	982	711	602	409	308
20	11,064	8,578	6,124	4,371	3,133	2,289	1,849	1,394	1,103	811	679	470	347
22	11,510	9,082	6,558	4,734	3,416	2,515	2,026	1,535	1,223	912	756	530	386
24	11,956	9,585	6,992	5,097	3,699	2,741	2,203	1,675	1,344	1,013	832	590	425
26	12,403	10,089	7,425	5,460	3,982	2,968	2,379	1,815	1,465	1,114	909	650	463
30	13,295	11,096	8,292	6,185	4,548	3,420	2,733	2,096	1,706	1,316	1,063	771	541
40	15,527	13,614	10,461	7,999	5,962	4,551	3,618	2,797	2,309	1,821	1,447	1,072	735
60	20,000	18,563	14,797	11,626	8,791	6,812	5,387	4,200	3,515	2,830	2,215	1,674	1,126
78	20,000	20,000	18,591	14,800	11,267	8,791	6,934	5,428	4,570	3,713	2,886	2,202	1,475

## RufCyl\_Jerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	122	90	90	72	60	43	27	20	15	13	9	7	7
4	124	91	88	72	59	44	27	19	14	12	9	7	7
6	125	95	87	72	59	45	28	18	13	10	8	7	7
8	127	102	90	75	62	48	28	18	13	10	8	7	7
10	134	106	91	81	66	49	28	18	13	10	8	7	7
12	149	115	98	84	70	52	30	18	14	10	9	7	7
14	177	127	105	92	74	55	33	20	16	11	10	7	7
16	205	144	115	97	79	58	36	23	19	13	12	8	8
18	232	164	129	103	85	64	41	26	21	15	13	9	8
20	260	183	144	112	94	71	46	30	23	16	14	10	9
22	288	202	159	122	103	79	51	33	25	18	15	11	10
24	316	221	174	133	112	86	56	36	27	20	16	12	11
26	344	240	189	144	121	93	61	39	30	21	18	13	12
30	399	278	218	166	139	108	72	46	34	25	20	15	13

## Initial Supporting table - RufCyl\_Jerk

40	538	373	292	220	183	145	97	62	45	33	26	20	17
60	816	564	440	329	273	218	149	94	68	50	38	29	25
78	1,059	731	570	425	352	282	194	122	87	64	49	37	32

## 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 altitude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

## RufSCD\_Decel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

## RufSCD\_Decel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	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
4	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
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

Initial Supporting table - RufSCD\_Decel

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

## 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 near TDC. Thresholds are a function of rpm and % engine Load.

## RufSCD\_Jerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

## RufSCD\_Jerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	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
4	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
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

## Initial Supporting table - RufSCD\_Jerk

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

## Initial Supporting table - Misfire\_IMEP\_BinID\_Load\_Axis

**Description:** Cylinder LOAD for defining Y AXIS in Misfire\_IMEP\_BinID\_versus\_Speed\_and\_Load

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 X AXIS in Misfire\_IMEP\_BinID\_versus\_Speed\_and\_Load

y/x	1	2	3	4	5	6	7	8	9
1	880	1,110	1,340	1,570	1,800	2,030	2,260	2,490	2,720

## Initial Supporting table - Misfire\_IMEP\_BinID\_vs\_RPM\_Load

**Description:** Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load "bin". Each Bin has its own "bin ID". This Bin ID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimizing 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

y/x	0	1	2	3	4	5	6	7	8
0	1	18	35	53	70	86	103	120	138
1	1	18	35	53	70	86	103	120	138
2	2	19	36	54	71	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	66	83	100	117	134	151

## Initial Supporting table - Misfire\_IMEP\_Thresh\_vs\_BinID

**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) estimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimizing 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\_Load\_Axis and Misfire\_IMEP\_BinID\_RPM\_Axis tables

## 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	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777

## 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	-777	-777	50	50	50	70	60	60	45	35	40	50	50	80	80	200	-777

## 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	-777	50	50	30	60	70	50	80	70	80	30	50	80	80	200	200	-777

## 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	-777	50	60	50	80	80	70	40	80	50	100	100	200	120	200	200	-777

## 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	-777	50	50	50	100	100	100	50	80	100	100	100	200	150	150	150	-777

## 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	-777	50	30	70	100	150	60	50	50	100	160	80	150	100	80	70	-777

## 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	-777	50	40	50	30	100	100	100	80	80	80	100	200	100	80	80	-777

## 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	-777	30	35	80	100	100	50	80	60	80	100	100	150	200	200	200	-777

## 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
1	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777

**Initial Supporting table - P0324\_PerCyl\_ExcessiveKnock\_Threshold****Description:** Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

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	1.63	1.63	1.75	1.88	2.13	2.38	2.13	1.88	2.25	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63

**Initial Supporting table - P0325\_P0330\_OpenCktThrshMax (20 kHz)****Description:** Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

y/x	680	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	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

## 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).

y/x	680	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	0.6191	0.6191	0.6191	0.6191	0.6191	0.6191	0.6191	0.5996	0.5605	0.5195	0.4727	0.4277	0.3691	0.3691	0.3691	0.3691	0.3691

## Initial Supporting table - P0325\_P0330\_OpenCktThrshMin (20 kHz)

**Description:** Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

y/x	680	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	2.1992	2.1777	2.1484	2.1426	2.1133	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016	2.1016

## 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).

y/x	680	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	0.0000	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.

## P0325\_P0330\_OpenMethod\_2 - Part 1

y/x	0	1	2	3	4
1	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM

## P0325\_P0330\_OpenMethod\_2 - Part 2

y/x	5	6	7	8	9
1	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM

## P0325\_P0330\_OpenMethod\_2 - Part 3

y/x	10	11	12	13	14
1	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM

## P0325\_P0330\_OpenMethod\_2 - Part 4

y/x	15	16			
1	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_UseExact RPM			

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)

y/x	0	1	2	3	4	5	6	7
1	1	1	1	1	0	0	0	0

**Initial Supporting table - P0326\_P0331\_AbnormalNoise\_Threshold****Description:** Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOT in AFM mode

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	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

## 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.

y/x	680	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	0.246	0.270	0.270	0.289	0.279	0.320	0.400	0.471	0.529	0.680	0.850	1.189	1.199	1.400	1.600	1.801	2.000

**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.

y/x	680	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	0.000	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

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	Loop rate calibration either 10 milliseconds or 12.5 milliseconds  service mode \$04 active battery voltage battery voltage time  ETRS ECM/CHCM frame recieved	= CeCFMD_e_DEC_Time Base_12p5  = FALSE ≥ 11.00 volts ≥ 300.000 seconds  = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

21OBDG03D TCM Summary Tables

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

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit Low	C124F	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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional  update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\leq -3.8500 \text{ g}$  $\geq -3.8500 \text{ g}$  ( $\leq 0.5 \text{ } \Omega$ impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ $= 1 \text{ Boolean}$  $=$ CeLATR_e_VoltageDirec tProp  $= \text{FALSE}$ $= \text{FALSE}$	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit High	C1250	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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional  update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\geq 3.8500 \text{ g}$  $\leq 3.8500 \text{ g}$  ( $\leq 0.5 \Omega$ impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.  Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal)  update raw lateral acceleration signal fail, 50 millisecond update rate	$\geq 0.5300$ g  $\leq 3.8500$ g	battery voltage run crank voltage diagnostic monitor enable  update raw lateral acceleration signal stability time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnostic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip  ABS(raw lateral acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	$\geq 11.00$ volts $\geq 11.00$ volts = 1 Boolean    $\geq 15.0$ KPH = TRUE  = TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th $\leq 100.0$ RPM  < 0.5300 g   = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emission Neutral Diagnostic – Type C

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit Low	C1252	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.  Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional  update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\leq -3.8500$ g  $\geq -3.8500$ g  ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00$ volts $\geq 11.00$ volts = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw longitudinal acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit High	C1253	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.  Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional  update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	$\geq 3.8500 \text{ g}$  $\leq 3.8500 \text{ g}$  ( $\leq 0.5 \text{ } \Omega$ impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable  sensor type is either directly proportional or inversely proportional  U0073 fault active U0073 test fail this key on	$\geq 11.00 \text{ volts}$ $\geq 11.00 \text{ volts}$ = 1 Boolean  = CeLATR_e_VoltageDirec tProp  = FALSE = FALSE	raw longitudinal acceleration signal stability time $\geq 30.0$ seconds, fail time $\geq 75.0$ seconds out of sample time $\geq 120.0$ seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic – Type C

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	<p>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.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)</p> <p>update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate</p>	≥ 0.5300 g	<p>battery voltage run crank voltage diagnostic monitor enable region 1 specific enable</p> <p>update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)</p> <p>update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed</p>	<p>≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean</p> <p>≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 15.0 KPH ≤ 200.0 KPH</p>	<p>raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate</p> <p>region 1 fail time ≥ 75.0 seconds out of region 1 sample time ≥ 120.0 seconds, 50 millisecond update rate</p>	Emission Neutral Diagnostic – Type C

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)  update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable  update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean  ≥ 15.0 KPH ≤ 0.5300 g  = TRUE  = TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g  ≤ 3.8500 g	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					acceleration signal)  update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed  ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	   ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g  ≥ 0.0 KPH ≤ 0.0 KPH  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 2 fail time ≥ 75.0 seconds out of region 2 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)  update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable  update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean  ≥ 15.0 KPH ≤ 0.5300 g  = TRUE  = TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)  update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed  ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g  ≤ 3.8500 g  ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 3 fail time ≥ 75.0 seconds out of region 3 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)  update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable  update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean  ≥ 15.0 KPH ≤ 0.5300 g  = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)  update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed  ABS(raw longitudinal acceleration signal) update sample time  U0073 fault active U0073 test fail this key on DTCs not fault active	= TRUE = TRUE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g  ≤ 3.8500 g   ≤ 0.70 % ≤ 80.0 Nm ≤ 0.1500 g  ≥ 0.0 KPH ≤ 0.0 KPH  < 0.5300 g  = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time ≥ 75.0 seconds out of region 4 sample time ≥ 120.0 seconds, 50 millisecond update rate	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Performance	P0561	Detects a low performing 12V battery system. This diagnostic reports the DTC when the absolute value of the difference between the battery voltage and the run/ crank voltage exceeds a calibrated value.	Run Crank voltage low and high	ABS(Battery voltage - Run Crank voltage) > 3.00	Battery voltage B+ line present = TRUE  Battery voltage low and high diag enable = TRUE  Run Crank voltage	1.00  1.00  Voltage ≥ 5.00 volts	40 failures out of 50 samples  100 ms / sample	Type A, 1 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary 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 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				In all cases, the failure count is cleared when controller shuts down				

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	This DTC will be stored if the DEC ECU has not been flash programmed with production software and calibration.	controller not flash programmed calibration	= 1 Boolean	controller normal power up initialization, ignition run crank transtions from low to high  service Mode \$04 active during one second loop	= FALSE	at controller power up intitalization one time (one event/ occurance) OR in one second time loop	Type A, 1 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	
			ECC ROM fault detected in NVM Flash region				Diagnostic runs at controller power up.	
			ECC ROM Error Count >	3				
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >=	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 a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system 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)	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 processors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was received	Run/Crank voltage  Run/Crank voltage	>= 8.00 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent or 10 counts continuous; 100 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was received			In the secondary processor, 64 / 161 counts intermittent or 0.1875 s continuous; 0.4875 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/under flow since last powerup reset >=	5		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			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 Secondary processor's ALU check			Test is Enabled: 1 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		Test is Enabled: 0 (If 0, this test is disabled)  time from initialization >= 0.5000 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	35.000 seconds	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 0 CPU 1 enable 1 CPU 2 enable 0 CPU 3 enable 0 CPU 4 enable	25 ms	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						(If 0, this test is disabled)		
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is 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		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is 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 occurred 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 occurred 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	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 1 (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: <b>P0606 enable (CPU, 100 msec)</b> <b>P0606 enable (CPU, 10 msec)</b> <b>P0606 enable (CPU, 12.5 msec)</b> <b>P0606 enable (CPU, 20 msec)</b> <b>P0606 enable (CPU, 25 msec)</b> <b>P0606 enable (CPU, 40 msec)</b> <b>P0606 enable (CPU, 50 msec)</b> <b>P0606 enable (CPU, 5 msec)</b> <b>P0606 enable (CPU, 6.25 msec)</b> <b>P0606 enable (CPU, 80 msec)</b> <b>P0606 enable (CPU, EventA)</b> <b>P0606 enable (CPU, EventB)</b> <b>P0606 enable (CPU, EventC)</b> see supporting table	Fail Table, f(Loop Time). See supporting tables: <b>P0606_PSW Sequence Fail f (Loop Time)</b> /  Sample Table, f (Loop Time)See supporting tables: <b>P0606_PSW Sequence Sample f(Loop Time)</b>  counts  50 ms/count in 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.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables:	

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0606_Last Seed Timeout f (Loop Time)	

# 21OBDG03D TCM Summary Tables

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

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq 0.5 \Omega$ impedance between signal and controller ground	<p>diagnostic monitor enable</p> <p>high side drive ON</p> <p>service mode \$04 not active</p> <p>service fast learn not active</p> <p>P0658 fault active</p> <p>P0658 test fail this key on</p>	<p>= 1 Boolean</p> <p>= TRUE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>fail count <math>\geq 6</math> counts</p> <p>out of sample count <math>\geq 2,400</math> counts</p> <p>6.25 millisecond update rate</p>	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 sensor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sensor, and, raw transmission fluid temperature sensor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	$\leq 15.0\text{ }^{\circ}\text{C}$	<p>diagnostic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage</p> <p>run crank voltage</p> <p>warm up test enable TFT rationality diagnostic monitor enabled</p> <p>driver accelerator pedal position engine torque engine speed vehicle speed engine coolant temperature engine coolant temperature raw transmission fluid temperature raw transmission fluid temperature</p> <p>P2818 fault active P2818 test fail this key on</p> <p>DTCs not fault active</p>	<p>= 1 Boolean</p> <p><math>\geq 9.00\text{ volts}</math></p> <p><math>\geq 9.00\text{ volts}</math></p> <p>= 1 Boolean = VeTFSR_b_TFT_RatlEnbl</p> <p><math>\geq 5.0\text{ }\%</math></p> <p><math>\geq 50.0\text{ Nm}</math> <math>\geq 500.0\text{ RPM}</math> <math>\geq 10.0\text{ KPH}</math> <math>\geq -40.0\text{ }^{\circ}\text{C}</math></p> <p><math>\leq 150.0\text{ }^{\circ}\text{C}</math></p> <p><math>\geq -273.0\text{ }^{\circ}\text{C}</math></p> <p><math>\leq 150.0\text{ }^{\circ}\text{C}</math></p> <p>= FALSE = FALSE</p>	<p>transmission fluid temperature warm up time <math>\geq</math> <b>transmission fluid temperature warm up time</b> seconds</p> <p>battery voltage time <math>\geq 0.100</math> seconds</p> <p>run crank voltage time <math>\geq 0.100</math> seconds</p>	Type B, 2 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	≥ 80.0 °C	diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage  run crank voltage  intermittent test enable propulsion system active	= 1 Boolean  ≥ 9.00 volts  ≥ 9.00 volts  = 1 Boolean = TRUE	sample count ≥ 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time  fail time ≥ 8.0 seconds out of sample time ≥ 12.0 seconds  battery voltage time ≥ 0.100 seconds  run crank voltage time ≥ 0.100 seconds	
			raw transmission fluid temperature - previous	≤ 0.0000 °C			fail time ≥ 300.0 seconds	



21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			raw transmission fluid temperature, update rate 100 milliseconds, update fail time		diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage  run crank voltage  stuck in range test enable propulsion system active raw transmission fluid temperature raw transmission fluid temperature	= 1 Boolean  ≥ 9.00 volts  ≥ 9.00 volts  = 1 Boolean = TRUE ≥ -273.0 °C ≤ 150.0 °C	battery voltage time ≥ 0.100 seconds  run crank voltage time ≥ 0.100 seconds	

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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 1 seconds update rate	$\leq 13.500 \ \Omega$	diagnostic monitor enable  battery voltage  run crank voltage run crank voltage in range time	= 1 Boolean  $\geq 9.00 \text{ volts}$  $\geq 9.00 \text{ volts}$	fail time $\geq 5.00$ seconds out of sample time $\geq$ 6.00 seconds 1 seconds update rate  battery voltage in range time $\geq$ 0.100 seconds  run crank voltage in range time $\geq$ 0.100 seconds	Type B, 2 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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 1 seconds update rate	$\geq 284,177.0 \ \Omega$	diagnostic monitor enable  battery voltage  run crank voltage run crank voltage in range time	= 1 Boolean  $\geq 9.00$ volts  $\geq 9.00$ volts	fail time $\geq 5.00$ seconds out of fail time $\geq 6.00$ seconds 1 seconds update rate  battery voltage in range time $\geq$ 0.100 seconds  run crank voltage in range time $\geq$ 0.100 seconds	Type B, 2 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 accumulated 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  delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	≥ 2,000.0 RPM	service mode \$04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on  last valid raw transmission input speed OR valid raw transmission input speed (before drop event)  last valid raw transmission input speed updates very 25 milliseconds when stability time complete as long as (delta delta raw transmission input speed AND raw transmission input speed)  raw transmission output speed accelerator pedal position engine torque engine torque  transmission hydraulic pressure available: engine speed  DTCs not fault active	= FALSE = 1 Boolean = FALSE = FALSE = FALSE  ≥ 160.0 RPM OR ≥ 160.0 RPM  ≤ 320.0 RPM AND > 160.0 RPM  ≥ 254.0 RPM ≥ 5.0 % ≤ 8,191.9 Nm ≥ 30.0 Nm  ≥ 500.0 RPM  AcceleratorPedalFailure EngineTorqueEstInaccuracy	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate  raw transmission input speed time ≥ 2.000 seconds  stability time ≥ 0.100 seconds  engine speed time ≥	Type A, 1 Trips

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							engine speed time for transmission hydraulic pressure available	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open circuit 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 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 OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE,  update fail time 25 millisecond update rate	≤ 100.0 RPM  < 475.0 RPM	service mode \$04 active  diagnostic monitor enable run crank voltage  service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque (transmission current attained gear transmission current attained gear raw transmission output speed OR transmission current attained gear transmission current attained gear raw transmission output speed) P0717 fault active P0717 test fail this key on	= FALSE  = 1 Boolean ≥ 5.00 volts  = FALSE ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE  = CeBRKR_e_OBD  < 70.0 % = FALSE = FALSE = FALSE ≥ 5.0 % ≥ 30.0 Nm ≤ 8,191.9 Nm ≤ CeCGSR_e_CR_Seventh  ≥ CeCGSR_e_CR_First  ≥ 162.0 RPM  ≤ CeCGSR_e_CR_Tenth  ≥ CeCGSR_e_CR_Seventh	fail time ≥ 4.00 seconds  run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled</p> <p>transmission hydraulic pressure available: engine speed</p> <p>DTCs not fault active</p>	<p>≥ 263.0 RPM</p> <p>= FALSE = FALSE</p> <p>= 0 Boolean = 1 Boolean</p> <p>≥ 500.0 RPM</p> <p>EngineTorqueEstInaccuracy</p>	<p>engine speed time ≥ <b>engine speed time for transmission hydraulic pressure available</b></p>	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 when TOSS transitional period = FALSE AND TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE  update fail and sample time 6.26 millisecond update rate	≠ FORWARD  ≠ REVERSE  ≥ 225.0 RPM	service mode \$04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on  TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward  TOSS transitional period detected = TRUE when: on period on period when direction unknown  senor type is directional senor type calibration	= FALSE = 1 Boolean ≠ 0 counts  = FALSE = FALSE  ≥ 0.4434 seconds ≤ 0.2773 seconds  < 0.2363 seconds > 0.1240 seconds  < 0.0811 seconds > 0.0088 seconds  < 0.4434 seconds > 0.2773 seconds  = CeTOSR_e_Directional	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open circuit 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, update fail time 6.25 millisecond update rate  when: attained gear  attained gear  AND attained gear  use high gear fail time threshold ELSE use low gear fail time threshold	≤ 30.0 RPM   ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth  > CeCGSR_e_CR_Fourth	service mode \$04 active  diagnostic monitor enable  when neutral range occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) AND (engine torque accelerator pedal position)  when not neutral range occurs: attained gear attained gear (attained gear  engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low)  when not neutral range occurs: (attained gear  engine torque hysteresis high engine torque hysteresis low	= FALSE  = 1 Boolean  ≠ COMPLETE  = PARK  = NEUTRAL  ≠ no inhibit active  ≥ 8,192.0 Nm ≥ 100.0 %  ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth ≥ 50.0 Nm  > 30.0 Nm ≥ 5.0 % > 3.0 %  ≤ CeCGSR_e_CR_Fourth ≥ 80.0 Nm  > 50.0 Nm	fail time ≥ 5.00 seconds high gear OR fail time ≥ 3.50 seconds low gear	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position hysteresis high accelerator pedal position hysteresis low)  TISS enable occurs when: (TISS speed select OR TISS/TOSS has single power supply calibration AND TISS AND TISS) OR (TISS speed select OR TISS/TOSS has single power supply calibration AND TISS AND TISS)  P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on  PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active)  run crank voltage  service fast learn active	≥ 8.0 %  > 5.0 %  = 1 Boolean = 0 Boolean ≤ 8,191.9 RPM ≥ 475.0 RPM ≠ 1 Boolean = 0 Boolean ≤ 8,191.9 RPM ≥ 5,800.0 RPM  = FALSE = FALSE = FALSE = FALSE  ≠ 1 Boolean = 1 Boolean = TRUE  ≥ 5.00 volts  = FALSE	run crank voltage time ≥ 25 milliseconds	

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run crank voltage transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on P0722 fault active P0722 test fail this key on transmission hydraulic pressure available: engine speed  DTCs not fault active	$\geq 9.00$ volts $\geq -40.00$ °C  = FALSE = FALSE = FALSE = FALSE = FALSE  $\geq 500.0$ RPM  AcceleratorPedalFailure EngineTorqueEstInaccu te	engine speed time $\geq$ <b>engine speed  time for  transmission  hydraulic  pressure  available</b>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 accumulated 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.	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate	≥ 700.0 RPM  ≥ 700.0 RPM	service mode \$04 active diagnostic monitor enable      transmission engaged state    4WD low state  PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active)  run crank voltage  service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on  when PRNDL is moved to	= FALSE = 1 Boolean      ≠ not engaged    = 4WD low state previous loop, 25 millisecond update rate  ≠ 1 Boolean = 1 Boolean = TRUE  ≥ 5.00 volts  = FALSE ≥ 9.00 volts = FALSE = FALSE	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate  transmission engaged state time ≥ <b>P0723 transmission engaged state time threshold</b>  4WD low change time ≥ 3.0 seconds  run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation:</p> <p>PRNDL OR</p> <p>PRNDL OR</p> <p>PRNDL OR</p> <p>raw transmission output speed OR last valid raw transmission output speed</p> <p>determine if raw transmission input speed is stable: (raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND raw transmission input speed) OR (TISS/TOSS has single power supply calibration AND raw transmission input speed)</p>	<p>= CeTRGR_e_PRNDL_Neutral = CeTRGR_e_PRNDL_Transitional1 N-D transitional = CeTRGR_e_PRNDL_Transitional4 R-N transitional ≥ 250.0 RPM</p> <p>≥ 250.0 RPM</p> <p>≤ 4,095.9 RPM</p> <p>≥ 160.0 RPM</p> <p>= 0 Boolean</p> <p>= 0.0 RPM</p>	<p>raw transmission input speed stability time ≥ 2.00 seconds</p> <p>no time required</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>select delta RPM fail threshold: (4WD low state AND \$WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold</p> <p>last valid raw transmission output speed OR valid raw transmission output speed (before drop event)</p> <p>last valid raw transmission output speed updates very 25 milliseconds when stability time complete as long as (delta delta raw transmission output speed AND raw transmission output speed)</p> <p>transmission hydraulic pressure available: engine speed</p> <p>DTCs not fault active</p>	<p>= TRUE = TRUE</p> <p>&gt; 89.0 RPM  &gt; 89.0 RPM</p> <p>≤ 140.0 RPM ≥ 89.0 RPM</p> <p>≥ 500.0 RPM</p> <p>AcceleratorPedalFailure EngineTorqueEstInaccurate</p>	<p>raw transmission output speed time ≥ 2.00 seconds</p> <p>stability time ≥ 0.100 seconds</p> <p>engine speed time ≥ <b>engine speed time for transmission hydraulic pressure available</b></p>	

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C1 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C1 clutch slip speed valid</p> <p>C1 clutch pressured map</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p> <p>= mapped to line</p>	≥ 1.000 seconds	



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 C1 CB123456 clutch pressure control solenoid.			<p>(enable forward gear cal AND driver direction request AND Attained Gear)</p> <p>OR</p> <p>(enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>P2821 (clutch select valve stuck on) test active</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>*****</p> <p>DTCs not fault active</p>	<p>pressure, C1 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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 P17CE P1783</p>		

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: C1 clutch slip speed OR shift type is garage shift: C1 clutch slip speed ELSE shift is another type: C1 clutch slip speed  update fail time 6.25 milliscond update	< 50.0 RPM  < 100.00 RPM  < 50.0 RPM			Base fail time:  shift type is power down shift: fail time ≥ 0.80 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.150 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, GR10 C1 CB123456R, or 8 Speed C1 CB1278R clutch pressure control solenoid.			<p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>range shift state</p> <p>diagnostic clutch test</p> <p>transmission output shaft speed</p> <p>((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)</p> <p>OR</p> <p>C1 off going clutch command pressure )</p>	<p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>≠ range shift complete</p> <p>= OFF GOING CLUTCH TEST</p> <p>≥ 89.0 RPM</p> <p>= TRUE</p> <p>= 1 ( 1 to enable, 0 to disable)</p> <p>≤ 350.0 kPa</p>	<p>exhaust delay by shift type:</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: <b>C1 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C1 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C1 exhaust delay garage shift</b>  closed throttle downshift: <b>C1 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C1 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C1 exhaust delay open throttle power down shift</b>	
					(engine torque AND Primary oncoming stuck on torque enable cal)	$\geq 8,191.8 \text{ Nm}$  = 0 (0 is enable, 1 is enable)		

## 21OBDG03D TCM Summary Tables

[illegible]

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initalized OR</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transitioning to a different clutch controller)  current clutch solenoid test state  ***** DTCs not fault pending  DTCs not fault active  DTCs not test fail this key on	= TRUE  transitions to TestState or TUT_HOLD (see note below about state transitions)  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. 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:</p>	P172A P172B *****		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C2 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C2 clutch slip speed valid</p> <p>C2 clutch pressured map</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p> <p>= mapped to line</p>	≥ 1.000 seconds	

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 C2 CB29 clutch pressure control solenoid.			<p>(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>P2821 (clutch select valve stuck on) test active</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>pressure, C2 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable) = FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable) = REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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 P17CE P1783</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: C2 clutch slip speed OR shift type is garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed  update fail time 6.25 millisecond update	< 50.00 RPM  < 100.00 RPM  < 50.00 RPM			Base fail time:  shift type is power down shift: fail time ≥ 0.80 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.15 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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  TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled  service fast learn active  service solenoid cleaning procedure active  hydraulic pressure available  *****  range shift state  diagnostic clutch test  transmission output shaft speed  ((C2 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)  OR  C2 off going clutch command pressure )	= TRUE Boolean  = TRUE Boolean  = FALSE Boolean  = FALSE Boolean  = TRUE  *****  ≠ range shift complete  = OFF GOING CLUTCH TEST  ≥ 89.0 RPM  = TRUE  = 1 ( 1 to enable, 0 to disable)  ≤ 350 kPa		

exhaust delay by shift type:

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: <b>C2 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C2 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C2 exhaust delay garage shift</b>  closed throttle downshift: <b>C2 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C2 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C2 exhaust delay open throttle power down shift</b>	
					(engine torque AND Primary oncoming stuck	$\geq 8,192 \text{ Nm}$  $= 0$ (0 is enable, 1 is		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal)  OR  ( primary oncoming clutch active  primary on coming control state  primary on coming commanded pressure)	enable)  = TRUE  ≠ clutch fill phase  ≥ pressure clip threshold according to shift type:  closed throttle upshift: <b>Clutch Clip Press CU Shifts</b>  open throttle upshift: <b>Clutch Clip Press PU Shifts</b>  garage shifts: <b>Clutch Clip Press GS Shifts</b>  closed throttle downshift: <b>Clutch Clip Press CD Shifts</b>  negative torque upshift: <b>Clutch Clip Press NU Shifts</b>  open throttle downshift: <b>Clutch Clip Press PD Shifts</b>  = TRUE	absolute value of ( -0.60 ) seconds	
					C2 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed			

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>calculation</p> <p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>been initalized OR transitioning to a different clutch controller)</p> <p>current clutch solenoid test state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p> <p>DTCs not test fail this key on</p>	<p>= TRUE</p> <p>= TRUE</p> <p>transitions to TestState or TUT_HOLD (see note below about state transitions)</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732</p>		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the</p>	<p>P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B *****</p>		



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>automatic transmission shift, until: 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. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	$\leq 0.2500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P077D fault active service fast learn  run crank voltage battery voltage  P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE       ≥ 10.00 volts ≥ 10.00 volts  = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate  fail count ≥ 16 counts 12.5 millisecond update rate  run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	$\geq 4.7500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P077C fault active service fast learn  run crank voltage battery voltage  P077D fault active P077D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE    $\geq 10.00$ volts $\geq 10.00$ volts  = FALSE = FALSE	fail time $\geq 0.050$ seconds, update fail count 12.5 millisecond update rate  fail count $\geq 16$ counts 12.5 millisecond update rate  run crank and battery voltage time $\geq 5.000$ seconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C3 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C3 clutch slip speed valid</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p>	≥ 1.000 seconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 CB38 clutch pressure control solenoid.			C3 clutch pressured map  (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)  P2821 (clutch select valve stuck on) test active  range shift state  ***** DTCs not fault pending          DTCs not fault active	= mapped to line pressure, C3 clutch pressure has reached fully applied state  = 1 (1 to enable, 0 to disable) = FORWARD  = a FORWARD gear  = 0 (1 to enable, 0 to disable) = REVERSE  = REVERSE  = FALSE  = range shift complete  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: C3 clutch slip speed OR shift type is garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed  update fail time 6.25 milliscond update	< 50.00 RPM  < 100.00 RPM  < 50.00 RPM			Base fail time:  shift type is power down shift: fail time ≥ 0.80 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.15 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, GR10 C3 C23457910, or 8 Speed C3 C13567 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled  TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled  service fast learn active  service solenoid cleaning procedure active  hydraulic pressure available  *****  range shift state  diagnostic clutch test  transmission output shaft speed  ((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)  OR  C3 off going clutch command pressure )	= TRUE Boolean  = TRUE Boolean  = FALSE Boolean  = FALSE Boolean  = TRUE  *****  ≠ range shift complete  = OFF GOING CLUTCH TEST  ≥ 89.0 RPM  = TRUE  = 1 ( 1 to enable, 0 to disable)  ≤ 350 kPa	exhaust delay by shift type:	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(engine torque AND Primary oncoming stuck on torque enable cal)	$\geq 8,192 \text{ Nm}$ $= 0$ (0 is enable, 1 is enable)	closed throttle upshift: <b>C3 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C3 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C3 exhaust delay garage shift</b>  closed throttle downshift: <b>C3 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C3 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C3 exhaust delay open throttle power down shift</b>	

## 21OBDG03D TCM Summary Tables

[illegible]

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initalized OR</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transitioning to a different clutch controller)  current clutch solenoid test state  ***** DTCs not fault pending    DTCs not fault active    DTCs not test fail this key on	= TRUE  transitions to TestState or TUT_HOLD (see note below about state transitions)  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. 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:</p>	P172A P172B *****		



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 input/turbine speed sensor raw voltage, update fail time, 12.5 millisecond update rate	$\leq 0.2500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P07C0 fault active service fast learn  run crank voltage battery voltage  P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE       ≥ 10.00 volts ≥ 10.00 volts  = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate  fail count ≥ 16 counts 12.5 millisecond update rate  run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	$\geq 4.7500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P07BF fault active service fast learn  run crank voltage battery voltage  P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE   $\geq 10.00$ volts $\geq 10.00$ volts  = FALSE = FALSE	fail time $\geq 0.050$ seconds, update fail count 12.5 millisecond update rate  fail count $\geq 16$ counts 12.5 millisecond update rate  run crank and battery voltage time $\geq 5.000$ seconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.  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 diagnostic monitor enable  run crank voltage run crank voltage time  run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE  DTCs not fault pending	= FALSE = 1 Boolean  ≥ 5.00 volts ≥ 25 milliseconds  ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE  ≥ 1.00 seconds  = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean  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 diagnostic monitor enable  run crank voltage run crank voltage time  run crank voltage P1761 fault active	= FALSE = 1 Boolean  ≥ 5.00 volts ≥ 25 milliseconds  ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE  DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE  ≥ 1.00 seconds  = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean  Transmission Shift Lever Position Validity		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.  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 diagnostic monitor enable  run crank voltage run crank voltage time  run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE  DTCs not fault pending	= FALSE = 1 Boolean  ≥ 5.00 volts ≥ 25 milliseconds  ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE  ≥ 1.00 seconds  = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean  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 diagnostic monitor enable  run crank voltage run crank voltage time  run crank voltage P1761 fault active	= FALSE = 1 Boolean  ≥ 5.00 volts ≥ 25 milliseconds  ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE  DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE  ≥ 1.00 seconds  = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean  Transmission Shift Lever Position Validity		



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range.  Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode \$04 active diagnostic monitor enable  run crank voltage  run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean  ≥ 5.00 volts  ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time ≥ 60.00 seconds  run crank voltage time ≥ 25 milliseconds	Emissions Neutral Diagnostics – Type C

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00 \text{ volts and } \leq 32.00 \text{ volts}$  $\geq 5.00 \text{ volts}$  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 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)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON							
OR								
(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON							

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active OR Power Mode  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = ACCESSORY  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage  OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.000$ seconds  25 milliseconds  12.5 milliseconds	Type A, 1 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	<p>The diagnostic monitor detects a failure of the wheel speed sensor signals serial data values to have been update in a sequential manner. The diagnostic monitor determines that valid serial data frames are being received by the controller, and, the actual sequencing, the sequence counter, is not incrementing normally. If the sequence counter has stopped cycling when normal communication is occurring, a sequence error has occurred.</p> <p>Emission neutral state defaults wheel speed sensor signals serial data values to 0.0 RPM.</p>	<p>IF sequence number raw</p> <p>THEN update fail time AND SET sequence number previous is to current frame sequence number</p>	= sequence number previous	<p>diagnostic monitor enable calibration run crank voltage for 25 milliseconds run crank voltage</p> <p>[(wheel speed serial data type front wheel angular AND rear wheel velocity available, which occurs when loss communication with ABS U0121 NOT fault pending) OR (wheel speed serial data type loss communication with ABS U0121 fault pending non-driven wheel rotational speed fails soft, which occurs when controller is receiving frame data in normal receive time)]</p> <p>sequence number raw is updated when controller is receiving frame data in normal receive time, otherwise sequence number is frozen at the last valid frame value</p> <p>normal frame receive time</p>	<p>= 1 Boolean</p> <p>≥ 5.00 volts</p> <p>≥ 11.00 volts</p> <p>= revolutions per second</p> <p>= available</p> <p>= pulse count and time stamp</p> <p>= FALSE</p> <p>= FALSE</p> <p>≥ 10.0 seconds</p>	<p>fail time ≥ 2.000 seconds update rate 25 milliseconds</p>	<p>Emission Neutral Diagnostic – Type C</p>

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 2	P16E9	This DTC detects intermittent 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 before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	100 / 16 counts continuous; 12.5 ms /count in the TCM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	8 / 16 counts continuous; 12.5 ms /count in the TCM main processor	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermittent 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 before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	100 / 16 counts continuous; 12.5 ms /count in the TCM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	8 / 16 counts continuous; 12.5 ms /count in the TCM main processor	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	<p>The diagnostic monitor is a rationalization of command values: command clutch pressures and command gear. The monitor is broken up into two fault detection routines, command pressure (tie up) fault detection and command gear/shift fault detection.</p> <p>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 rational, one or more of</p>	<p>command pressure (tie up) fault detection</p> <p>minimum # of clutches ON by attained gear and by commanded gear, take lower of the 2 values, where attained gear is the current operating gear and command gear is the targetted value to transition toward</p> <p>see <b>9 speed transmission clutch definition and gear state to clutch map</b> and <b>10 speed transmission clutch definition and gear state to clutch map</b> attached supporting tables for clutch 1 through clutch 7 definition and gear state to clutch map</p>	$\leq$ <b>NumClchTieUp</b> See Attached Supporting Tables	<p>Redundant Memory Command Pressure Enable Calibration Not</p> <p>Redundant Memory Command Pressure Enable Calibration</p> <p>No traction event in progress:  <math>\text{ABS}((\text{driven wheel speed} - \text{non-drive wheel speed}) / \text{driven wheel speed})</math></p> <p>25 millisecond derivative TOSS RPM, (TOSS delta 25 millisecond loop to 25 millisecond loop) / 25 millisecond for time</p> <p>Clutch 1 hydraulic volume fill factor            Clutch 2 hydraulic volume fill factor            Clutch 3 hydraulic volume fill factor            Clutch 4 hydraulic volume fill factor            Clutch 5 hydraulic volume fill factor            Clutch 6 hydraulic volume fill factor            Clutch 7 hydraulic volume fill factor</p> <p>when clutch is off going (releasing) clutch the commanded clutch pressure equation =            ((pressure control solenoid command</p>	<p>= 0 Boolean</p> <p>= 1 Boolean</p> <p><math>\geq 0.00 \%</math></p> <p><math>&lt; 0.750 *</math>  <b>P2D2 Cltch Slip Sum</b>            see attached supporting Table</p> <p><math>\geq 0.0500</math> seconds</p> <p><math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless  <math>\geq 1.000</math> unitless</p>	<p>single event</p> <p>6.25 millisecond update rate</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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 driver accelerator position.</p>			<p>pressure - pressure offset) * regulator valve gain) - regulator valve return spring pressure adaptive</p> <p>when clutch 1 is off going clutch: clutch 1 command pressure</p> <p>clutch 1 state is OFF when: clutch 1 command pressure, else clutch is ON and count clutch 1 toward minimum # of clutches ON</p> <p>when clutch 2 is off going clutch: clutch 2 command pressure</p> <p>clutch 2 state is OFF when: clutch 2 command pressure, else clutch is ON and count clutch 2 toward minimum # of clutches ON</p> <p>when clutch 3 is off going clutch: clutch 3 command pressure</p>	<p>= ((clutch 1 pressure control solenoid command pressure - 0.00 ) * 1.00 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C1</b> see attached supporting tables</p> <p>= ((clutch 2 pressure control solenoid command pressure - 0.00 ) * 1.00 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C2</b> see attached supporting tables</p> <p>= ((clutch 3 pressure</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>clutch 3 state is OFF when: clutch 3 command pressure, else clutch is ON and count clutch 3 toward minimum # of clutches ON</p> <p>when clutch 4 is off going clutch: clutch 4 command pressure</p> <p>clutch 4 state is OFF when: clutch 4 command pressure, else clutch is ON and count clutch 4 toward minimum # of clutches ON</p> <p>when clutch 5 is off going clutch: clutch 5 command pressure</p> <p>clutch 5 state is OFF when: clutch 5 command pressure.</p>	<p>control solenoid command pressure - 177.00 ) * 1.51 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C3</b> see attached supporting tables</p> <p>= ((clutch 4 pressure control solenoid command pressure - 160.00 ) * 2.25 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C4</b> see attached supporting tables</p> <p>= ((clutch 5 pressure control solenoid command pressure - 0.00 ) * 1.00 ) - regulator valve return spring pressure adaptive, kPa</p>		



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>else clutch is ON and count clutch 5 toward minimum # of clutches ON</p> <p>when clutch 6 is off going clutch: clutch 6 command pressure</p> <p>clutch 6 state is OFF when: clutch 6 command pressure, else clutch is ON and count clutch 6 toward minimum # of clutches ON</p> <p>when clutch 7 is off going clutch: clutch 7 command pressure</p> <p>clutch 7 state is OFF when: clutch 7 command pressure, else clutch is ON and count clutch 7 toward minimum # of clutches ON</p> <p>service fast learn not active</p>	<p><b>P2D2 Decel Pressure - ≤ C5</b> see attached supporting tables</p> <p>= ((clutch 6 pressure control solenoid command pressure - 0.00 ) * 1.00 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C6</b> see attached supporting tables</p> <p>= ((clutch 7 pressure control solenoid command pressure - 0.00 ) * 1.00 ) - regulator valve return spring pressure adaptive, kPa</p> <p><b>P2D2 Decel Pressure - ≤ C7</b> see attached supporting tables</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6  no high side driver DTCs fault active: P0658, P2670			
			command gear/shift fault detection		Redundant Memory Command Gear Enable Calibration Not	= 0 Boolean	command gear fail event count ≥ 3 counts	
			1st gear commanded and vehicle seed OR 2nd gear commanded and vehicle seed OR 3rd gear commanded and vehicle seed OR 4th gear commanded and vehicle seed OR 5th gear commanded and vehicle seed OR 6th gear commanded and vehicle seed OR 7th gear commanded and vehicle seed OR 8th gear commanded and	> 54.44 KPH  > 77.21 KPH  > 84.75 KPH  > 104.36 KPH  > 132.75 KPH  > 176.54 KPH  > 255.27 KPH	Redundant Memory Command Gear Enable Calibration  service fast learn not active  no speed sensor DTCs fault active:  P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6  no high side driver DTCs fault active:	= 1 Boolean	6.25 millisecond update rate	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle seed OR 9th gear commanded and vehicle seed OR 10th gear commanded and vehicle seed THEN increment command gear fail event count and abort commanded gear and delay for time before next fail evaluation	> 341.73 KPH  > 413.73 KPH  > 413.73 KPH      > 5.00 seconds	P0658, P2670			

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Speed Signal Analog to Digital Converter Performance	P16FB	The diagnostic monitor validates the controller calculated transmission output speed sensor data parameters, calculated in multiple paths/subroutines and at different rates. There are multiple transmission output speed sensor data parameters, calculated at rates of 6.25 milliseconds, 12.5 milliseconds and 25 milliseconds. While the same subroutine, a generic "calculate TOSS" is called from different time loops, each call stores that current value of the calculated TOSS to a different memory location. For example, a 12.5 millisecond loop calling "calculate TOSS" stores the calculated TOSS value to a "12.5 millisecond TOSS calculated" data parameter in memory, while a 25 millisecond loop calling "calculate TOSS" stores the calculated TOSS value to a "25 millisecond TOSS calculated" data parameter in memory. The raw transmission output speed sensor	ABS(raw transmission output speed, 6.25 millisecond data parameter - raw transmission output speed, 25 millisecond data parameter) update fail and sample time 25 millisecond update rate	≥ 60.0 RPM	service mode \$04 active diagnsotic monitor enable  raw transmission output speed, 25 millisecond data parameter  raw transmission output speed, 6.25 millisecond data parameter  run crank voltage battery voltage	= FALSE = 1 Boolean  ≥ 356.0 RPM  ≥ 356.0 RPM  ≥ 10.00 volts ≥ 10.00 volts	fail time ≥ 8.000 seconds out of sample time ≥ 10.000 seconds 25 millisecond update rate              run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		signal is diagnosed independently electrically and for performance of this DTC. The transmission output speed sensor data parameters that are calculated at different rates must always be within a negligible difference of each other.						

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.  Emission neutral default state sets lateral and longitudinal acceleration signal = 0.0 g.	rolling count value received from EBCM and expected TCM calculated value not equal OR checksum lateral and longitudinal acceleration CAN frame message value error  50 millisecond update rate	= TRUE  = TRUE	enable alive rolling count error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received battery voltage run crank voltage  enable checksum error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received normal CAN battery voltage run crank voltage communication enabled  DTCs not fault active	= 1 Boolean = TRUE  ≥ 11.0 volts ≥ 11.0 volts  = 1 Boolean = TRUE  ≥ 11.0 volts ≥ 11.0 volts = TRUE  U0073	alive rolling count errors ≥ 54 out of 9 sample counts 50 millisecond update rate  checksum error time ≥ 54.00 seconds	Emissions Neutral Diagnostic – Type C

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	<p>The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame data to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up.</p> <p>Emissions neutral default, disables tap-up tap-down or manual-up manual-down.</p>	<p>alive rolling count error counter update fail time 100 millisecond update rate</p>	≥ 3 counts	<p>service mode \$04 active diagnostic monitor enable</p> <p>run crank voltage run crank voltage time</p> <p>up and down shift serial data frame receive occurred</p> <p>when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE,</p> <p>when alive rolling count error AND previous alive rolling count error in 10 element array buffer, increment alive rolling count error counter</p>	<p>= FALSE = 1 Boolean</p> <p>≥ 9.00 volts ≥ 0.100 seconds</p> <p>= TRUE</p> <p>≠ frame alive rolling count data value</p> <p>= TRUE</p> <p>= FALSE</p>	fail time ≥ 10.00 seconds	Emissio ns Neutral Diagnost ics – Type C

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded))  update fail time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable          speed sesnor configuration calibration is single OR dual  ratio calibration is function of command gear and intermediate speed senor when not REVERSE  ratio calibration is function of command gear and intermediate speed sesnor when REVERSE  ***** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration)	= 1 Boolean          = CeTNSR_e_NSPD_Singl eSpdSnsr  <b>P176B ratio calibration</b> = <b>when not REVERSE</b> see supporting tables  <b>P176B ratio calibration</b> = <b>when REVERSE</b> see supporting tables  ***** ≥ <b>P176B minimum estimated transmission intermediate speed to enable fail evaluation</b> see supporting tables	fail time ≥ <b>P176B intermediate speed sensor fail time threshold</b> see supporting tables  fail time threshold met increments fail count, fail count ≥ <b>P176B intermediate speed sensor fail count threshold</b> see supporting tables  ***** delay time ≥	Type A, 1 Trips



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>with</p> <p>transmission input speed</p> <p>input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with with attained gear</p> <p>*****</p> <p>transmission input speed transmission output speed neutral idle mode range shift state P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active P176C fault active P176D fault active battery voltage</p>	<p><b>P176B minimum transmission input speed to enable fail ≥ evaluation see supporting tables</b></p> <p><b>P176B holding clutch = states see supporting tables</b></p> <p>= REVERSE OR = 1st thru 10th</p> <p>*****</p> <p>≥ 172.0 RPM ≥ 89.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 9.00 volts</p> <p>= FALSE ≥ 9.00 volts</p>	<p><b>P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation see supporting tables</b></p>	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service fast learn active run crank voltage  transmission hydraulic pressure available: engine speed	≥ 500.0 RPM	battery voltage time ≥ 0.100 seconds  run crank voltage time ≥ 0.100 seconds  engine speed time ≥ <b>engine speed time for transmission hydraulic pressure available</b> see supporting tables	

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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	$\leq 0.2500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P176D fault active service fast learn  run crank voltage battery voltage  P176C fault active P176C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE  $\geq 10.00$ volts $\geq 10.00$ volts  = FALSE = FALSE	fail time $\geq 0.050$ seconds, update fail count 12.5 millisecond update rate  fail count $\geq 40$ counts 12.5 millisecond update rate  run crank and battery voltage time $\geq 5.000$ seconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 sensor raw voltage, update fail time, 12.5 millisecond update rate	$\geq 4.7500$ volts ( $\leq 0.5 \Omega$ impedance between signal and controller power)	<p>service mode \$04 active diagnostic monitor enable P176C fault active service fast learn</p> <p>run crank voltage battery voltage</p> <p>P176D fault active P176D test fail this key on</p>	<p>= FALSE = 1 Boolean = FALSE = FALSE</p> <p><math>\geq 10.00</math> volts <math>\geq 10.00</math> volts</p> <p>= FALSE = FALSE</p>	<p>fail time <math>\geq 0.050</math> seconds, update fail count 12.5 millisecond update rate</p> <p>fail count <math>\geq 40</math> counts 12.5 millisecond update rate</p> <p>run crank and battery voltage time <math>\geq 5.000</math> seconds</p>	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ETRS GMLAN Command Signal Message Incorrect	P1775	The diagnostic monitor detects an alive rolling count error or protection value (checksum) error in the CAN bus frame containing the Electronic Transmission Range Selector (ETRS) signal data. The alive rolling count sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the alive rolling count in this sequence manner. The receiving controller compares the most recent received alive rolling count value to the previous value plus one. If the values are not equal, an alive rolling count error has occurred. The protection value is based on the checksum of the ETRS data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the ECM/CHCM ETRS data message frame, the	rolling count value received from ECM/CHCM and expected TCM calculated value not equal	= TRUE	Loop rate calibration either 10 milliseconds or 12.5 milliseconds  service mode \$04 active battery voltage battery voltage time  ETRS ECM/CHCM frame recieved	CeCFMD_e_DEC_Time Base_12p5  = FALSE ≥ 11.00 volts ≥ 300.000 seconds  = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		TCM calculates the protection value, again based on the ETRS data parameters, in the receive message frame. If the TCM calculated protection value does not equal the protection value incorporated in the ECM/CHCM ETRS data message frame, a or protection value error has occurred. If continuous alive rolling count errors or protection value errors occur, the DTC is set.						

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion	= CePSCD_e_VoltDirct Prop	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWM sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample  6.25 millisecond update rate	
			raw sensor % duty cycle	≤ 9.998 % duty cycle				
			sensor voltage indirect proportion	= CePSCD_e_VoltDirct Prop				
			raw sensor % duty cycle	≥ 9.998 % duty cycle				



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion	= CePSCD_e_VoltDirct Prop	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWMsensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample  6.25 millisecond update rate	
			raw sensor % duty cycle	≥ 91.998 % duty cycle				
			sensor voltage indirect proportion	= CePSCD_e_VoltDirct Prop				
			raw sensor % duty cycle	≤ 91.998 % duty cycle				

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion	= CePSCD_e_VoltDirct Prop	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWM sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample	
			raw sensor % duty cycle	≤ 9.998 % duty cycle				
			sensor voltage indirect proportion	= CePSCD_e_VoltDirct Prop			6.25 millisecond update rate	
			raw sensor % duty cycle	≥ 9.998 % duty cycle				

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion	= CePSCD_e_VoltDirct Prop	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWMsensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample	
			raw sensor % duty cycle	≥ 91.998 % duty cycle				
			sensor voltage indirect proportion	= CePSCD_e_VoltDirct Prop			6.25 millisecond update rate	
			raw sensor % duty cycle	≤ 91.998 % duty cycle				

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck On	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.	<p>when: (Park Valve Position Sensor A OR Park Valve Position Sensor B) AND (out of park state calculated OR out of park state calculated) update delay time</p> <p>when: delay time AND</p> <p>fail time</p> <p>increment fail count</p>	<p>= PARK</p> <p>= PARK</p> <p>= UNKNOWN</p> <p>= PARK</p> <p>≥ <b>Park Valve Stk On Dly Lim</b></p> <p>&gt;= <b>Park Valve Stk On Fail Lim</b></p>	<p>park servo enable ETRS system type is internal ETRS</p> <p>battery voltage for battery voltage time diagnostic monitor enable</p> <p>park state transition is TRUE when: (out of park state calculated OR out of park state calculated) AND P187D, P187E Test Fail This Key On AND ((ETRS command direction AND out of park state) OR (ETRS command direction AND out of park state)) otherwise park state transition is FALSE</p> <p>park state transition AND (P17F5, P17F6, P17F7 Fault Active OR P17FA, P17FB, P17FC Fault Active) AND P187D, P187E Fault Active</p> <p>park servo stuck on available is TRUE when: ETRS command direction AND</p>	<p>= 1 Boolean = CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts ≥ 1.000 seconds = 1 Boolean</p> <p>= PARK = OUT OF PARK = FALSE = PARK ≠ PARK ≠ PARK ≠ PARK</p> <p>= TRUE = FALSE = FALSE = FALSE</p> <p>≠ PARK</p>	<p>fail count ≥ 2 counts</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					line pressure command AND ((ETRS command direction AND P18AB Test Fail This Key On AND mode valve A pressure) OR (ETRS command direction AND P18A8 Test Fail This Key On AND (mode valve A pressure OR mode valve B pressure)) OR (ETRS command direction AND P18AD Test Fail This Key On AND mode valve B pressure) OR (ETRS command direction AND ((P18AB Test Fail This Key On AND mode valve A pressure) OR (P18AD Test Fail This Key On AND mode valve B pressure))) OR (ETRS command direction AND P18AB Test Fail This Key On AND mode valve B pressure)) otherwise park servo stuck on available is FALSE  hydraulic pressure	>= 120.00  = DRIVE = FALSE  >= 195.00  = NEUTRAL LOW = FALSE => 195.00 => 295.00  = NEUTRAL HIGH = FALSE => 295.00  = NEUTRAL SHIFT = FALSE => 195.00 = FALSE => 295.00  = REVERSE = FALSE => 295.00		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE  hydraulic pressure available park servo stuck on available  (mode valve A state attained OR P18AA Test Fail This Key On OR P27EC Test Fail This Key On OR P27EC Fault Pending) AND (mode valve B state attained OR P18AC Test Fail This Key On OR P27F0 Test Fail This Key On OR P27F0 Fault Pending)	≥ 500.0 RPM <b>Hydraulic Press Avail</b> ≥ Tm Thrsh  = TRUE = TRUE  = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE		

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck Off	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: ETRS command direction out of park state update delay time  when: delay time  increment fail time	= PARK ≠ PARK  ≥ <b>Park Valve Eng Off Dly Lim</b>	park servo enable ETRS system type is internal ETRS  battery voltage for battery voltage time engine mode run  hydraulic pressure available is TRUE when: engine speed for engine speed time otherwise hydraulic pressure available is FALSE  hydraulic pressure available surge accumulator on/off request engine off diagnostic enabled  P187D, P187E Test Fail This Key On	= 1 Boolean = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.000 seconds = FALSE  ≥ 500.0 RPM ≥ <b>Hydraulic Press Avail Tm Thrsh</b>  = FALSE = FALSE = 1 Boolean  = FALSE	fail time ≥ <b>Park Valve Eng Off Dly Lim</b> seconds  update rate 6.25 milliseconds	Type A, 1 Trips
			when: (Park Valve Position Sensor A OR Park Valve Position Sensor B) AND (out of park state calculated OR out of park state calculated) update delay time  when: delay time AND	= OUT OF PARK = OUT OF PARK = UNKNOWN = OUT OF PARK  ≥ <b>Park Valve Stk Off Dly Lim</b>	park servo enable ETRS system type is internal ETRS  battery voltage for battery voltage time diagnostic monitor enable  park state transition is TRUE when: (out of park state calculated OR out of park state calculated) AND	= 1 Boolean = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.000 seconds = 1 Boolean  = PARK = OUT OF PARK	fail count ≥ 2 counts  update rate 6.25 milliseconds	



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			fail time  increment fail count	>= <b>Park Valve Stk Off Fail Lim</b>	P187D, P187E Test Fail This Key On AND ((ETRS command direction AND out of park state) OR (ETRS command direction AND out of park state)) otherwise park state transition is FALSE  park servo stuck off availabe is TRUE when: park state transtion ((P17F5, P17F6, P17F7 Fault Active OR P17FA, P17FB, P17FC Fault Active) AND (P187E, P187D Test Fail This Key On)) ((ETRS command direction AND ((P182A Fault Active) OR (P182A Fault Active AND calculated line pressure)) AND ((P18AA Test Fail This Key On AND P18AC Test Fail This Key On) OR ETRS mode enable valve state)) otherwise park servo stuck off availabe is FALSE  (((mode valve A state attained OR P18AA Test Fail This Key On OR	= FALSE  = PARK ≠ PARK  = OUT OF PARK  = PARK   = TRUE  = FALSE = FALSE = PARK = FALSE = TRUE ≥ 1,000.0 kPa  = FALSE = FALSE = ETRS zero limit (hydraulic cicruit exhausted)  = TRUE = TRUE		

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P27EC Test Fail This Key On OR P27EC Fault Pending) AND mode valve A pressure) AND ((mode valve B state attained OR P18AC Test Fail This Key On OR P27F0 Test Fail This Key On OR P27F0 Fault Pending) AND mode valve B pressure) OR ETRS mode enable valve state)	= TRUE = TRUE < 195.00 = TRUE = TRUE = TRUE = TRUE < 295.00 = ETRS zero limit (hydraulic cicruit exhausted)		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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  Range Command Secondary Updated	= FALSE 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 service mode \$04 active run/crank voltage run/crank voltage time	= 1 Boolean  = FALSE ≥ 5.00 volts ≥ 3,000.000 seconds	initial fail time ≥ 5.000 seconds  final fail time ≥ 375.000 seconds	Type B, 2 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit Low	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short or 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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground  OR  $\leq 0.5\text{ } \Omega$ impedance between signal and controller ground	((battery voltage AND battery voltage AND for battery voltage time run crank voltage for run crank voltage time) OR accessory voltage active))  diagnostic monitor enable calibration	$\geq 9.00$ volts $\leq 32.00$ volts $\geq 1.000$ seconds $\geq 5.00$ volts $\geq 25$ milliseconds  = TRUE for 12.5 milliseconds  = 1 Boolean	fail time $\geq 0.100$ seconds out of sample time $\geq 0.166$ seconds	Type B, 2 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p> <p>Increment fail time</p>	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	<p>((battery voltage AND battery voltage AND for battery voltage time run crank voltage for run crank voltage time) OR accessory voltage active))</p> <p>diagnostic monitor enable calibration</p>	<p><math>\geq 9.00</math> volts</p> <p><math>\leq 32.00</math> volts</p> <p><math>\geq 1.000</math> seconds</p> <p><math>\geq 5.00</math> volts</p> <p><math>\geq 25</math> milliseconds</p> <p>= TRUE for 12.5 milliseconds</p> <p>= 1 Boolean</p>	fail time $\geq 0.100$ seconds out of sample time $\geq 0.166$ seconds	Type B, 2 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Inhibit Solenoid Stuck Off	P18A8	This diagnostic monitor rationalizes the park inhibit solenoid based on the driver ETRS command direction and mode valve states.	when: P18A8 Test Fail This Key On mode valve A position mode valve B position park position sensor A park position sensor B update fail time	= FALSE  = mode valve low = mode valve low = PARK = PARK	park servo enable ETRS system type is internal ETRS  battery voltage for battery voltage time ignition inputs power mode  hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE  engine mode run AND engine off diagnostic enable AND [auto stop active OR (auto stop active AND hydraulic pressure available)]  (ETRS command direction AND diag park state	= 1 Boolean = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.000 seconds ≠ power mode off  ≥ 500.0 RPM ≥ <b>Hydraulic Press Avail Tm Thrsh</b>  = FALSE = 1 Boolean = TRUE = FALSE = FALSE  ≠ PARK = OUT OF PARK	fail time ≥ <b>PISA Stk Off Eng Off Dly Lim</b>  update rate 6.25 milliseconds	Type B, 2 Trips
			when: ETRS command direction P18A8 Test Fail This Key On diagnostic park state mode valve A position mode valve B position	= NEUTRAL LOW = FALSE  = OUT OF PARK = mode valve low = mode valve low	park servo enable ETRS system type is internal ETRS  battery voltage for battery voltage time	= 1 Boolean = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.000 seconds	fail counter >= 3.00  update rate 6.25 milliseconds	

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			park position sensor A park position sensor B  increment fail count	= PARK = PARK	ignition inputs power mode  Engine mode run AND P18E7 Fault Active AND P18E7 Fault Pending AND P18E8 Fault Active AND P18E8 Fault Pending AND P18A2 Fault Active AND P18A3 Fault Active AND P18A4 Fault Active	≠ power mode off  = TRUE = FALSE = FALSE  = FALSE = FALSE  = FALSE = FALSE = FALSE		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve A Stuck On	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state, which is in error, when commanded hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the "off" or "low" state.	Mode Valve A Position Sensor State  mode valve A pressure  (((ETRS commanded direction AND ETRS diagnostic range AND line pressure command) OR (ETRS commanded direction AND ETRS diagnostic range AND line pressure command)))  ((Mode valve A transition AND mode valve A state attained AND Mode valve A transition delay)  IF mode valve A transition FP (mode valve A fail timer	≠ Mode Valve Low  < 25.00  ≠ Drive or NeutShf  = Drive or NeutShf  ≠ 0  = NeutShf  = Drive  = 0  = FALSE  = FALSE  >= ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)  = FALSE  >= <b>Mode Vlv A GS TurbDly Lim</b>	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage battery voltage time ignition inputs power mode  (engine run mode OR hydraulic system pressure available)  Mode valve performance diagnostic enable  ETRS commanded direction  ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))  P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On	= 1 Boolean  = CeTRGR_e_InternalETRS ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = 1.00 Boolean  ≠ ETRS diagnostic range  = Park = FALSE = FALSE = FALSE = FALSE  ≠ Park = FALSE = FALSE = FALSE  = FALSE = FALSE  = FALSE = FALSE = FALSE = FALSE	When: ((Park is commanded AND fail count >= 2.00 ) OR (Park is not commanded AND fail count >= 2.00 ))  update rate 6.25 milliseconds	Type A, 1 Trips



## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			set mode valve A transition FP)	= TRUE	P27EC Test Fail This Key On	= FALSE		
			ELSE (set mode valve A transition FP)))	= TRUE	Mode valve A state attained = TRUE when: Mode valve A sensor position Mode valve sensor position	= mode valve A command = <b>Mode Valve A Final State</b>		
			OR  ((ETRS commanded direction ETRS diagnostic range mode valve A state attained mode valve A transition mode valve A final delay)	= NeutLo  = Park = FALSE  = TRUE >= ModeVlvA_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)	(mode valve A transition OR <b>Mode Valve A Trnsth State</b> )  Mode valve A transition = TRUE when: Mode valve A sensor position	= TRUE  = <b>Mode Valve A Final State</b>  = <b>Mode Valve A Trnsth State</b>		
			set mode valve A final FP)	= TRUE				
			IF mode valve A transition FP	= TRUE				
			OR mode valve A final FP (Increment fail count AND reset delay and fail timers)	= TRUE				
			Mode Valve A Position Sensor State	≠ Mode Valve Low	park diagnostic monitor enable	= 1 Boolean	Mode valve A steady state remedial delay >=	
			ETRS commanded direction AND mode valve A pressure	≠ Drive or NeutShf  <= 25.00	ETRS system configuration is internal ERTS battery voltage	= CeTRGR_e_InternalETR S		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>When: clutch slip OR (Mode valve A steady state delay</p> <p>park servo Mode valve A steady state fail time)</p> <p>increment mode valve A remedial timer</p>	<p>= slip detected</p> <p>&gt;= <b>Mode Vlv StdySt Park Dly Lim</b></p> <p>= OUT OF PARK</p> <p>&gt;= <b>Mode Valve A steady state turbine speed delay</b></p>	<p>battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)</p> <p>Mode valve performance diagnostic enable</p> <p>ETRS commanded direction</p> <p>P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On P27EC Test Fail This Key On</p> <p>mode valve steady state clutch slip = slip detected when: IF (commanded or attained gear C1 clutch slip speed validity) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed) gear slip timer) ELSE (commanded gear slip AND</p>	<p>≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off</p> <p>= TRUE</p> <p>= TRUE</p> <p>= 1.00 Boolean</p> <p>= ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= 1 FW</p> <p>= FALSE</p> <p>= clutch control ≠ GSCR &gt; upper bound</p> <p>&lt; lower bound ≥ 0.10</p>	<p><b>Mode Valve A StdySt Rmdl Lim</b></p> <p>update rate 6.25 milliseconds</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					gear slip timer)  mode valve steady state clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	>= 150.00  >= 0.10     = TRUE  < 200.00 >= 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 >= 400.00  > 5.00  > 35.00  >= 0.05		
			Mode Valve A Position Sensor State  IF (max line pressure) Mode valve A engine off transition delay  ELSE mode valve A engine off transition delay	≠ Mode Valve Low  = FALSE >= <b>Mode Valve A Eng Off Dly Lim</b>  >=	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode engine run mode AND	= 1 Boolean  = CeTRGR_e_InternalETR S ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = FALSE	IF (max line pressure = FALSE) Mode valve A fail timer >= <b>Mode Valve A Eng Off Dly Lim</b>  ELSE	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				<b>Mode Valve A Eng Off ML Lim</b>	(hydraulic system pressure available OR auto stop active)  GF9 engine off diagnosis enable P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active	= FALSE  = TRUE  = 1 Boolean  = FALSE  = FALSE = FALSE = FALSE	mode valve A fail timer >= <b>Mode Valve A Eng Off ML Lim</b>  update rate 6.25 milliseconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve A Stuck Off	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.	Mode Valve A Position Sensor State  ETRS commanded direction  (mode valve A pressure OR drive latch present)  (clutch slip OR (mode valve A steady state delay AND (park servo line pressure line pressure use) OR (mode valve steady state fail)))  increment remedial timer	≠ Mode Valve High  = Drive OR NeutShf  > 195.00  = TRUE  = slip detected  >= <b>Mode Vlv StdySt Park Dly Lim</b>  = PARK >= 450.00 ≠ diag min line action  >= <b>Mode Valve A steady state turbine speed delay</b>	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  position sensor diagnostic monitor enable  ETRS commanded direction  P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On P27EC Test Fail This Key On  mode valve steady state clutch slip = slip detected when: IF (commanded or attained gear C1 clutch slip speed validity) ELSE IF (range shift state active clutch control (turbine speed	= 1 Boolean  = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = 1 Boolean  = ETRS diagnostic range  = FALSE  = FALSE = FALSE = FALSE = FALSE  = 1 FW  = FALSE  = clutch control	Mode valve A steady state remedial delay >= <b>Mode Valve A StdySt Rmdl Lim</b>  update rate 6.25 milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR turbine speed) gear slip timer) ELSE (commanded gear slip AND gear slip timer)  mode valve steady state clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	≠ GSCR > upper bound  < lower bound >= 0.10  >= 150.00  >= 0.10  = TRUE  < 200.00 >= 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 >= 400.00  > 5.00  > 35.00  >= 0.05		
			Mode Valve A Position Sensor State  mode valve A pressure	≠ Mode Valve High  > 195.00	park diagnostic monitor enable ETRS system configuration is internal ERTS	= 1 Boolean  = CeTRGR_e_InternalETR S	mode valve A transition fail count OUT OF PARK ≥ 2 counts	

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(ETRS commanded direction ETRS diagnostic range  (Mode valve A transition AND mode valve A state attained AND Mode valve A transition delay)  IF mode valve A transition FP (mode valve A fail timer  set mode valve A transition FP)  ELSE set mode valve A transition FP)  OR  ((ETRS commanded direction AND ETRS diagnostic range)  (Mode valve A transition AND mode valve A state	= Drive or NeutShf  ≠ Park  = FALSE  = FALSE  >= ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)  = FALSE  >= <b>Mode Vlv A GS            TurbDly Lim</b> = TRUE  = TRUE  = Drive, NeutShf, or NeutLo  = Park  = FALSE  = FALSE	battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  position sensor diagnostic monitor enable  ETRS commanded direction  ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))  P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On P27EC Test Fail This Key On  Mode valve A state attained = TRUE when:	≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = 1 Boolean  ≠ ETRS diagnostic range  = Park = FALSE = FALSE = FALSE = FALSE  ≠ Park = FALSE = FALSE = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE  = FALSE	update rate 6.25 milleseconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>attained AND Mode valve A transition delay)</p> <p>IF mode valve A transition FP (park servo AND mode valve A fail timer set mode valve A transition FP)</p> <p>ELSE set mode valve A transition FP</p> <p>IF mode valve A transition FP (increment fail counter)</p>	<p>&gt;= ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)</p> <p>= FALSE</p> <p>= PARK</p> <p>&gt;= <b>Mode Vlv A GS TurbDly Lim</b> = TRUE</p> <p>=TRUE</p> <p>= TRUE</p>	<p>Mode valve A sensor position Mode valve A sensor position (mode valve A transition OR <b>Mode Valve A Trnstn State</b> )</p> <p>Mode valve A transition = TRUE when: Mode valve A sensor position</p>	<p>= mode valve A command = <b>Mode Valve A Final State</b> = TRUE = <b>Mode Valve A Final State</b>  = <b>Mode Valve A Trnstn State</b></p>		



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve B Stuck On	P18AC	This diagnostic monitor detects a Mode Valve B Position Sensor State in the "on" or "high" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the "off" or "low" state.	Mode Valve B Position Sensor State  mode valve B pressure  (ETRS commanded direction  When: clutch slip OR Mode valve B steady state delay  park servo Mode valve B steady state fail time)  increment mode valve B remedial timer	≠ Mode Valve Low  < 25.00  = Drive, NeutLo, or Park  = slip detected  >= <b>Mode Vlv StdySt Park Dly Lim</b> = OUT OF PARK >= <b>Mode Valve B steady state turbine speed delay limit</b>	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  position sensor diagnostic monitor enable  ETRS commanded direction  P18AC Test Fail This Key On P18AD Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P27F0 Test Fail This Key On  mode valve steady state clutch slip = slip detected when: IF (commanded or attained gear C1 clutch slip speed validity) ELSE IF (range shift state active clutch control (turbine speed	= 1 Boolean  = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = 1.00 Boolean  = ETRS diagnostic range  = FALSE  = FALSE  = FALSE = FALSE = FALSE = FALSE  = 1 FW  = FALSE  = clutch control	mode valve B remedial time ≥ <b>Mode Valve B StdySt Rmdl Lim</b> update rate 6.25 milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (turbine speed) (gear slip timer) ELSE (commanded gear slip AND gear slip timer)  mode valve steady state clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	≠ GSCR > upper bound  < lower bound >= 0.10  >= 150.00  >= 0.10  = TRUE  < 200.00 >= 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 >= 400.00  > 5.00  > 35.00  >= 0.05		
			Mode Valve B Position Sensor State	≠ Mode Valve Low	park diagnostic monitor enable	= 1 Boolean	When: ((Park is commanded AND fail count >=	
			mode valve B pressure	< 25.00	ETRS system configuration is internal	=		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(((ETRS commanded direction OR (ETRS commanded direction AND ETRS diagnostic range) OR (ETRS commanded direction AND ETRS diagnostic range AND mode enable valve stuck on test)  (mode valve B transition AND mode valve B state attained AND mode valve B transition delay timer)  IF mode valve B transition FP (mode valve B fail timer)  set mode valve B transition FP)  ELSE set mode valve B transition FP)	= Drive  = NeutLo  ≠ Park or Drive  = Park  ≠ Drive or NeutLo  = FALSE  = FALSE  = FALSE  >= ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)  = FALSE  >= <b>Mode Valve B garage shift turbine speed delay limit</b>  = TRUE  = TRUE	ERTS  battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  position sensor diagnostic monitor enable  ETRS commanded direction  ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))  P18AC Test Fail This Key On P18AD Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P27F0 Test Fail This Key On  Mode valve B state	CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = 1.00 Boolean  ≠ ETRS diagnostic range  = Park = FALSE = FALSE = FALSE = FALSE  ≠ Park = FALSE = FALSE = FALSE  = FALSE = FALSE  = FALSE = FALSE = FALSE = FALSE	2.00 ) OR (Park is not commanded AND fail count >= 2.00 ))transition fail ≥  update rate 6.25 milliseconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR  ((ETRS commanded direction AND ETRS diagnostic range) OR (ETRS commanded direction AND ETRS diagnostic range AND mode enable valve stuck on test)  Mode valve B transition AND mode valve B state attained AND mode valve B final delay)  set mode valve B final FP)  IF mode valve B transition FP OR mode valve A final FP (Increment fail count AND reset delay and fail timers)	= NeutLo  = Park  = Park or NeutLo  = Drive  = FALSE  = TRUE  = FALSE  >= ModeVlvB_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift) = TRUE  = TRUE  = TRUE	attained = TRUE when: Mode valve B sensor position Mode valve B sensor position  (mode valve B transition OR <b>Mode Valve B Trnstrn State</b>  Mode valve B transition = TRUE when: Mode valve B sensor position	= mode valve B command  = <b>Mode Valve B Final State</b> = TRUE  = <b>Mode Valve B Final State</b>  = <b>Mode Valve B Trnstrn State</b>		

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Mode Valve B Position Sensor State</p> <p>IF (max line pressure) Mode valve B engine off transition delay</p> <p>ELSE mode valve B engine off transition</p>	<p>≠ Mode Valve Low</p> <p>&gt;=</p> <p><b>Mode Valve B Eng Off Dly Lim</b></p> <p>&gt;=</p> <p><b>Mode Valve B Eng Off ML Lim</b></p>	<p>park diagnostic monitor enable ETRS system configuration is internal ERTS</p> <p>battery voltage batyer voltage time ignition inputs power mode engine run mode AND (hydraulic system pressure available OR auto stop active)</p> <p>GF9 engine off diagnsotic enable P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active</p>	<p>= 1 Boolean</p> <p>= CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p> <p>= 1 Boolean</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>IF (max line pressure = FALSE) Mode valve A fail timer &gt;=</p> <p><b>Mode Valve B Eng Off Dly Lim</b></p> <p>ELSE mode valve B fault timer &gt;=</p> <p><b>Mode Valve B Eng Off ML Lim</b></p> <p>update rate 6.25 milliseconds</p>	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve B Stuck Off	P18AD	This diagnostic monitor detects a Mode Valve B 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 B Position Sensor State changes correctly with mode valve state command.	Mode Valve B Position Sensor State AND mode valve B pressure AND (ETRS commanded direction AND clutch slip OR (mode valve B steady state delay AND (park servo line pressure line pressure use) OR mode valve B steady state fail))  OR  (ETRS commanded direction AND mode valve B steady state delay AND ((park servo line pressure line pressure use) OR mode valve B steady state fail)))  increment mode valve B steady state remedial timer	≠ Mode Valve High  ≥ 295.00  = Reverse  = slip detected  ≥ <b>Mode Vlv StdySt Park Dly Lim</b> = Park ≥ 450.00 ≠ diag min line action  ≥ <b>Mode Valve B steady state turbine speed delay limit</b>   = NeutHi or NeutShf  ≥ <b>Mode Vlv StdySt Park Dly Lim</b> = Park ≥ 450.00 ≠ diag min line action  ≥ <b>Mode Valve B steady state turbine speed delay limit</b>	park diagnostic monitor enable ETRS system configuration is internal ERTS  battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  engine auto stop active  position sensor diagnostic monitor enable  ETRS commanded direction  P18AC Test Fail This Key On P18AD Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P27F0 Test Fail This Key On  mode valve steady state clutch slip = slip detected when: IF (commanded or attained gear C1 clutch slip speed validity) ELSE IF	= 1 Boolean  = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = FALSE  = 1 Boolean  = ETRS diagnostic range  = FALSE = FALSE = FALSE = FALSE = FALSE  = 1 FW  = FALSE	mode valve B steady state remedial time ≥ <b>Mode Valve B StdySt Rmdl Lim</b>  update rate 6.25 milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(range shift state active clutch control (turbine speed OR turbine speed) gear slip timer) ELSE (commanded gear slip AND gear slip timer)  mode valve steady state clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	= clutch control ≠ GSCR > upper bound  < lower bound ≥ 0.10  ≥ 150.00  ≥ 0.10  = TRUE  < 150.00 ≥ 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 ≥ 400.00  > 5.00  > 35.00  ≥ 0.05		
			Mode Valve B Position Sensor State	≠ Mode Valve High	park diagnostic monitor enable	= 1 Boolean	mode valve B fail count PARK ≥ 2	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Mode Valve B pressure</p> <p>((ETRS commanded direction AND ETRS diagnostic range)</p> <p>(mode valve B transition AND mode valve B state attained AND mode valve B transition delay timer)</p> <p>IF mode valve B transition FP (park servo AND mode valve B fail timer</p> <p>set mode valve B transition FP)</p> <p>ELSE set mode valve B transition FP)</p> <p>OR</p> <p>((ETRS commanded direction</p>	<p>&gt;= 295.00</p> <p>= Reverse, NeutHi, NeutLo, or NeutShf</p> <p>= Park</p> <p>= FALSE</p> <p>= FALSE</p> <p>&gt;= ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)</p> <p>= FALSE</p> <p>= PARK</p> <p>&gt;= <b>Mode Valve B garage shift turbine speed delay limit</b></p> <p>= TRUE</p> <p>= TRUE</p> <p>= Reverse, NeutHi,</p>	<p>ETRS system configuration is internal ERTS</p> <p>battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)</p> <p>engine auto stop active</p> <p>position sensor diagnostic monitor enable</p> <p>ETRS commanded direction</p> <p>((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))</p> <p>P18AC Test Fail This Key On P18AD Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active</p>	<p>= CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p>= 1 Boolean</p> <p>≠ ETRS diagnoatic range</p> <p>= Park = FALSE = FALSE = FALSE = FALSE</p> <p>≠ Park = FALSE = FALSE = FALSE = FALSE</p> <p>= FALSE = FALSE = FALSE = FALSE</p>	<p>counts</p> <p>mode valve B fail count OUT OF PARK ≥ 2 counts</p> <p>update rate 6.25 milliseconds</p>	



## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND ETRS diagnostic range)  (mode valve B transition AND mode valve B state attained AND mode vlave B transition delay timer)  IF mode valve B transition FP (mode valve B fail timer  set mode valve B transition FP)  ELSE set mode valve B transition FP)))  Increment mode valve B fail counter	NeutLo, or NeutShf  ≠ Park  = FALSE  = FALSE  >= ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)  = FALSE  >= <b>Mode Valve B garage  shift turbine speed  delay limit</b> = TRUE  = TRUE	P27F0 Test Fail This Key On  Mode valve B state attained = TRUE when: Mode valve B sensor position Mode valve B sensor position  (mode valve B transition OR <b>Mode Valve B Trnstn  State</b>  Mode valve B transition = TRUE when: Mode valve B sensor position	= FALSE   = mode valve B command  = <b>Mode Valve B Final  State</b> = TRUE  = <b>Mode Valve B Final  State</b>  = <b>Mode Valve B Trnstn  State</b>		

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Enable Valve Stuck On	P18AE	This diagnostic monitor detects the Mode Valve A Solenoid stuck in the hydraulic on state.	Mode valve position sensor A  mode enable valve stuck on delay timer  increment fail counter	≠ Mode valve low  ≥ <b>Mode valve fail delay limit</b>	park diagnostic monitor enable ETRS system configuration is internal ERTS  battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  engine auto stop active  mode valve performance diagnostic monitor enable  ETRS command direction ETRS range mode enable valve stuck on diagnostic enable transmission fluid temperature transmission fluid temperature  P18AE Test Fail This Key On P2812 Fault Active P2815 Fault Active P0962 Fault Active P2738 Fault Active P0797 Fault Active P2715 Fault Active P18AA Fault Active P18AB Fault Active P27EC Fault Active P27EB Fault Active	= 1 Boolean  = CeTRGR_e_InternalETRS  ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = FALSE  = 1 Boolean  = PARK = DRIVE = 1 Boolean  ≥ 0.00 °C ≤ 256.0 °C  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	mode enable valve fail count ≥ 2 counts  update rate 6.25 milliseconds	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P27ED Fault Active P27EE Fault Active mode valve A init hi mode valve A sensor FP mode valve B sensor FP	= FALSE = FALSE = FALSE = FALSE = FALSE		

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "A" Performance	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.	<p>(ETRS commanded direction diagnostic park state (Park position sensor A Park position sensor B P187D Test Fail This Key On P187E Test Fail This Key On Park servo FP Park servo stuck off fail timer)</p> <p>OR</p> <p>(ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)</p> <p>OR</p> <p>(ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)</p> <p>OR</p> <p>(park position sensor A delay AND park position sensor fail timer)</p> <p>set park position sensor A FP increment park position sensor A fail counter</p>	<p>= PARK</p> <p>= PARK</p> <p>≠ PARK</p> <p>= PARK</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= 0</p> <p>≠ PARK</p> <p>= OUT OF PARK</p> <p>≠ OUT OF PARK</p> <p>= OUT OF PARK</p> <p>≠ PARK</p> <p>= PARK</p> <p>≠ OUT OF PARK</p> <p>= PARK</p> <p>&gt;=</p> <p><b>Park Position Sensor A Dly Lim</b></p> <p>&gt;= 0.25</p> <p>= TRUE</p>	<p>PARK diagnostic monitor enable ETRS system configuration is internal ERTS</p> <p>battery voltage battery voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)</p> <p>engine auto stop active</p> <p>park valve position sensor performance diagnostic monitor enable</p> <p>P17E7 fault active P17F5 fault active P17F6 fault active P17FC fault active P17FA fault active P17FB fault active P18E7 Test Fail This Key On Park position sensor A FP Park position sensor B FP P18E7 test Fail This Key On P18E8 Test Fail This Key On</p>	<p>= 1 Boolean</p> <p>= CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts</p> <p>≥ 1.00 seconds</p> <p>≠ power mode off</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p>= 1 Boolean</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>park valve position sensor A fail count ≥ 2 counts</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>(ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)</p> <p>(park position sensor A delay AND park position sensor fail timer)</p> <p>set park position sensor A FP increment park position sensor A fail counter</p>	<p>≠ PARK</p> <p>= OUT OF PARK</p> <p>≠ OUT Of PARK</p> <p>= OUT OF PARK</p> <p>&gt;=</p> <p><b>Park Position Sensor A Dly Lim</b></p> <p>&gt;= 0.25</p> <p>= TRUE</p>	<p>PARK diagnostic monitor enable ETRS system configuration is internal ERTS</p> <p>battery voltage battery voltage time ignition inputs power mode engine run mode (hydraulic system pressure available OR engine auto stop active)</p> <p>Engine off diagnostics enable</p> <p>P17E7 fault active</p> <p>P17F5 fault active</p> <p>P17F6 fault active</p> <p>P17FC fault active</p> <p>P17FA fault active</p> <p>P17FB fault active</p> <p>P18E7 Test Fail This Key On</p> <p>Park positin sensor A FP</p> <p>Park position sensor B FP</p> <p>P18E7 test Fail This Key On</p> <p>P18E8 Test Fail This Key On</p>	<p>= 1 Boolean</p> <p>=</p> <p>CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts</p> <p>≥ 1.00 seconds</p> <p>≠ power mode off</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p> <p>= 1.00 Boolean</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>park valve position sensor A fail count ≥ 2 counts</p> <p>update rate 6.25 milliseconds</p>	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "B" Performance	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.	(ETRS commanded direction diagnostic park state (Park position sensor A Park position sensor B)  OR (ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)  OR (ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)  Park position sensor B delay timer AND park position sensor fail timer  Set park position sensor B FP AND increment park position sensor fail count	= PARK  = PARK = PARK ≠ PARK   ≠ PARK  = OUT OF PARK = OUT OF PARK ≠ OUTOF PARK   = PARK = OUT OF PARK = PARK ≠ PARK  >= <b>Park Postition Sensor B Dly Lim</b> >= 0.25  = TRUE	PARK diagnostic monitor enable ETRS system configuration is internal ERTS  battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available)  engine auto stop active  park valve position sensor performance diagnostic monitor enable  park state transtion P17E7 fault active P17F5 fault active P17F6 fault active P17FC fault active P17FA fault active P17FB fault active Park position sensor A FP Park position sensor B FP P18E7 Test Fail This Key On P18E8 Test Fail this Key On	= 1 Boolean  = CeTRGR_e_InternalETRS   ≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = TRUE  = TRUE  = FALSE  = 1 Boolean  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	park valve position sensor B fail count ≥ 2 counts  update rate 6.25 milliseconds	Type A, 1 Trips
			(ETRS commanded direction diagnostic park state Park position sensor A Park position sensor B)	≠ PARK  = OUT OF PARK = OUT OF PARK ≠ OUTOF PARK	PARK diagnostic monitor enable  ETRS system configuration is internal ERTS	= 1 Boolean  = CeTRGR_e_InternalETRS	park valve position sensor B fail count ≥ 2 counts  update rate 6.25	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Park position sensor B delay timer AND park position sensor fail timer  Set park position sensor B FP AND increment park position sensor fail count	>= <b>Park Postition            Sensor B Dly Lim</b> >= 0.25  = TRUE	battery voltage batyer voltage time ignition inputs power mode engine run mode (hydraulic system pressure available OR engine auto stop active)  Engine off diagnostics enable  park state transtion P17E7 fault active P17F5 fault active P17F6 fault active P17FC fault active P17FA fault active P17FB fault active Park position sensor A FP Park position sensor B FP P18E7 Test Fail This Key On P18E8 Test Fail this Key On	≥ 8.00 volts ≥ 1.00 seconds ≠ power mode off  = FALSE  = FALSE  = TRUE = 1.00 Boolean  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	milleseconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position circuit. This diagnostic reports the DTC when this circuit is low. Monitoring occurs when the TCM run/crank is active.	Ignition switch Run/Start position circuit low	TCM Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable  and  Run / Crank active ECM	= 1.00    = TRUE	280 failures out of 280 samples  25 ms / sample	Type A, 1 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position circuit. This diagnostic reports the DTC when this circuit is high. Monitoring occurs when the TCM run/crank is NOT active.	Ignition switch Run/Start position circuit high	TCM Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable  and Run / Crank active ECM	= 1.00   = FALSE	280 failures out of 280 samples  25 ms / sample	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	$\leq \leq 0.5 \Omega$ impedance between signal and controller ground	diagnostic monitor enable high side drive 2 ON P2670 fault active P2670 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	<p>fail count <math>\geq 6</math> counts out of sample count <math>\geq 2,400</math> counts</p> <p>6.25 millisecond update rate</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C4 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C4 clutch slip speed valid</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p>	≥ 1.000 seconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 clutch pressure control solenoid.			C4 clutch pressured map  (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)  P2821 (clutch select valve stuck on) test active  range shift state  ***** DTCs not fault pending          DTCs not fault active	= mapped to line pressure, C4 clutch pressure has reached fully applied state  = 1 (1 to enable, 0 to disable) = FORWARD  = a FORWARD gear  = 0 (1 to enable, 0 to disable) = REVERSE  = REVERSE  = FALSE  = range shift complete  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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		

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed  update fail time 6.25 milliscond update	< 50.00 RPM  < 100.00 RPM  < 50.00 RPM			Base fail time:  shift type is power down shift: fail time ≥ 0.80 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.15 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C4 C4, GR10 C4 C23467810R, or 8 Speed C4 C23468 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled  TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled  service fast learn active  service solenoid cleaning procedure active  hydraulic pressure available  *****  range shift state  diagnostic clutch test  transmission output shaft speed  ((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)  OR  C4 off going clutch command pressure )	= TRUE Boolean  = TRUE Boolean  = FALSE Boolean  = FALSE Boolean  = TRUE  *****  ≠ range shift complete  = OFF GOING CLUTCH TEST  ≥ 89.0 RPM  = TRUE  = 1 ( 1 to enable, 0 to disable)  ≤ 350 kPa		

exhaust delay by shift type:

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: <b>C4 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C4 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C4 exhaust delay garage shift</b>  closed throttle downshift: <b>C4 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C4 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C4 exhaust delay open throttle power down shift</b>	
					(engine torque AND Primary oncoming stuck	$\geq 8,192 \text{ Nm}$  $= 0$ (0 is enable, 1 is		

## 210BDG03D TCM Summary Tables

[illegible]

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initialized</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR transitioning to a different clutch controller)  current clutch solenoid test state  ***** DTCs not fault pending  DTCs not fault active  DTCs not test fail this key on	= TRUE  transitions to TestState or TUT_HOLD (see note below about state transitions)  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission</p>	<p>P17C6 P17C4 P17C7 P172A P172B *****</p>		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>shift, until: 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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage  OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C5 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C5 clutch slip speed valid</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p>	≥ 1.000 seconds	

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 C57R clutch pressure control solenoid.			<p>C5 clutch pressured map</p> <p>(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>P2821 (clutch select valve stuck on) test active</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= mapped to line pressure, C5 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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</p>		

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed  update fail time 6.25 millisecond update	< 50.00 RPM  < 100.00 RPM  < 50.00 RPM			Base fail time:  shift type is power down shift: fail time ≥ 0.40 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.15 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, GR10 C5 C1356789, or 8 Speed C5 C45678R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled  TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled  service fast learn active  service solenoid cleaning procedure active  hydraulic pressure available  *****  range shift state  diagnostic clutch test  transmission output shaft speed  ((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)  OR  C5 off going clutch command pressure )	= TRUE Boolean  = TRUE Boolean  = FALSE Boolean  = FALSE Boolean  = TRUE  *****  ≠ range shift complete  = OFF GOING CLUTCH TEST  ≥ 89.0 RPM  = TRUE  = 1 ( 1 to enable, 0 to disable)  ≤ 350 kPa		

exhaust delay by shift type:

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: <b>C5 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C5 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C5 exhaust delay garage shift</b>  closed throttle downshift: <b>C5 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C5 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C5 exhaust delay open throttle power down shift</b>	
					(engine torque AND Primary oncoming stuck	$\geq 8,192 \text{ Nm}$  $= 0$ (0 is enable, 1 is		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal)  OR  ( primary oncoming clutch active  primary on coming control state  primary on coming commanded pressure)	enable)  = TRUE  ≠ clutch fill phase  ≥ pressure clip threshold according to shift type:  closed throttle upshift: <b>Clutch Clip Press CU Shifts</b>  open throttle upshift: <b>Clutch Clip Press PU Shifts</b>  garage shifts: <b>Clutch Clip Press GS Shifts</b>  closed throttle downshift: <b>Clutch Clip Press CD Shifts</b>  negative torque upshift: <b>Clutch Clip Press NU Shifts</b>  open throttle downshift: <b>Clutch Clip Press PD Shifts</b>  = TRUE	absolute value of ( -0.60 ) seconds	
					C5 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>calculation</p> <p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>been initialized OR transitioning to a different clutch controller)</p> <p>current clutch solenoid test state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p> <p>DTCs not test fail this key on</p>	<p>= TRUE</p> <p>= TRUE</p> <p>transitions to TestState or TUT_HOLD (see note below about state transitions)</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732</p>		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the</p>	<p>P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B *****</p>		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>automatic transmission shift, until: 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. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 CVT TCC 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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F (GF9)	P2731	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	<p>common logic between P2731 and P2733</p> <p>shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed</p> <p>P2731 specific attained gear</p> <p>update fail time 6.25 milliscond update</p>	<p>&lt; 50.00 RPM</p> <p>&lt; 100.00 RPM</p> <p>&lt; 50.00 RPM</p> <p>= 1st lock OR = 1st free wheel</p>			<p>Base fail time:</p> <p>shift type is power down shift: fail time ≥ 0.80 seconds</p> <p>shift type is garage shift: fail time ≥ 0.25</p> <p>shift type is another type: fail time ≥ 0.15 seconds</p> <p>Add fail time offset according to shift type:</p> <p>open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b></p> <p>open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b></p> <p>garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b></p> <p>closed throttle downshift:</p>	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C6 Selectable One Way Clutch (SOWC) / CBR1 clutch pressure control solenoid.			<p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>range shift state</p> <p>diagnostic clutch test</p> <p>transmission output shaft speed</p> <p>((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)</p> <p>OR</p> <p>C6 off going clutch command pressure )</p>	<p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>≠ range shift complete</p> <p>= OFF GOING CLUTCH TEST</p> <p>≥ 89.0 RPM</p> <p>= TRUE</p> <p>= 1 ( 1 to enable, 0 to disable)</p> <p>≤ 350 kPa</p>	<p>exhaust delay by shift type:</p>	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(engine torque AND Primary oncoming stuck on torque enable cal)	$\geq 8,192 \text{ Nm}$ $= 0$ (0 is enable, 1 is enable)	closed throttle upshift: <b>C6 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C6 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C6 exhaust delay garage shift</b>  closed throttle downshift: <b>C6 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C6 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C6 exhaust delay open throttle power down shift</b>	



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR  ( primary oncoming clutch active  primary on coming control state  primary on coming commanded pressure)	= TRUE  ≠ clutch fill phase  ≥ pressure clip threshold according to shift type:  closed throttle upshift: <b>Clutch Clip Press CU Shifts</b>  open throttle upshift: <b>Clutch Clip Press PU Shifts</b>  garage shifts: <b>Clutch Clip Press GS Shifts</b>  closed throttle downshift: <b>Clutch Clip Press CD Shifts</b>  negative torque upshift: <b>Clutch Clip Press NU Shifts</b>  open throttle downshift: <b>Clutch Clip Press PD Shifts</b>	absolute value of ( -0.60 ) seconds	
					C5 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation	= TRUE		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initialized</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR transitioning to a different clutch controller)  current clutch solenoid test state  ***** DTCs not fault pending  DTCs not fault active  DTCs not test fail this key on	= TRUE  transitions to TestState or TUT_HOLD (see note below about state transitions)  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission</p>	<p>P17C6 P17C4 P17C7 P172A P172B *****</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>shift, until: 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. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off (GF9)	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 or at zero RPM. 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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>enable C6 clutch slip speed fail compare when:</p> <p>((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below)</p> <p>unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)</p> <p>clutch steady state adaptive active</p> <p>(transmission output shaft speed OR (accelerator pedal position OR engine speed)</p> <p>C6 clutch slip speed valid</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 (0 to enable, 1 to disable)</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 %</p> <p>≥ 1,500.0 RPM</p> <p>= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)</p>	≥ 1.000 seconds	



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1 clutch pressure control solenoid.			<p>C6 clutch pressured map</p> <p>(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>P2821 (clutch select valve stuck on) test active</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= mapped to line pressure, C6 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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</p>		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not test fail this key on</p> <p>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</p>	<p>P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed  P2733 specific attained gear  update fail time  6.25 milliscond update	< 50.00 RPM  < 100.00 RPM  < 50.00 RPM  ≠ 1st lock AND ≠ 1st free wheel			Base fail time:  shift type is power down shift: fail time ≥ 0.80 seconds  shift type is garage shift: fail time ≥ 0.25  shift type is another type: fail time ≥ 0.15 seconds  Add fail time offset according to shift type:  open throttle upshift: <b>Clutch Stuck On Fail Offset Time PU Shifts</b>  open throttle downshift: <b>Clutch Stuck On Fail Offset Time PD Shifts</b>  garage shift: <b>Clutch Stuck On Fail Offset Time GS Shifts</b>  closed throttle downshift:	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p>	<p><b>Clutch Stuck On Fail Offset Time CD Shifts</b></p> <p>negative torque upshift: <b>Clutch Clip Press NU Shifts</b></p> <p>clutch staging shift: <b>Clutch Stuck On Fail Offset Time STGR Shifts</b></p> <p>update fail count, fail count ≥ 3 counts 6.25 millisecond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C6 C6789 or GR10 C6 C45678910R clutch pressure control solenoid.			<p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>range shift state</p> <p>diagnostic clutch test</p> <p>transmission output shaft speed</p> <p>((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)</p> <p>OR</p> <p>C6 off going clutch command pressure )</p>	<p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>≠ range shift complete</p> <p>= OFF GOING CLUTCH TEST</p> <p>≥ 89.0 RPM</p> <p>= TRUE</p> <p>= 1 ( 1 to enable, 0 to disable)</p> <p>≤ 350 kPa</p>	exhaust delay by shift type:	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(engine torque AND Primary oncoming stuck on torque enable cal)	$\geq 8,192 \text{ Nm}$ $= 0$ (0 is enable, 1 is enable)	closed throttle upshift: <b>C6 exhaust delay closed throttle lift foot up shift</b>  open throttle upshift: <b>C6 exhaust delay open throttle power on up shift</b>  garage shifts: <b>C6 exhaust delay garage shift</b>  closed throttle downshift: <b>C6 exhaust delay closed throttle down shift</b>  negative torque upshift: <b>C6 exhaust delay negative torque up shift</b>  open throttle downshift: <b>C6 exhaust delay open throttle power down shift</b>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR  ( primary oncoming clutch active  primary on coming control state  primary on coming commanded pressure)	= TRUE  ≠ clutch fill phase  ≥ pressure clip threshold according to shift type:  closed throttle upshift: <b>Clutch Clip Press CU Shifts</b>  open throttle upshift: <b>Clutch Clip Press PU Shifts</b>  garage shifts: <b>Clutch Clip Press GS Shifts</b>  closed throttle downshift: <b>Clutch Clip Press CD Shifts</b>  negative torque upshift: <b>Clutch Clip Press NU Shifts</b>  open throttle downshift: <b>Clutch Clip Press PD Shifts</b>	absolute value of ( -0.60 ) seconds	
					C5 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation	= TRUE		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initialized</p>	<p>*****</p> <p>≠ Garage shift</p> <p><b>Clutch Stuck On Shift = Type Enable</b> (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		



# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR transitioning to a different clutch controller)  current clutch solenoid test state  ***** DTCs not fault pending  DTCs not fault active  DTCs not test fail this key on	= TRUE  transitions to TestState or TUT_HOLD (see note below about state transitions)  ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6  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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>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 shift due to two conditions: 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. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed <math>\geq</math> clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission</p>	<p>P17C6 P17C4 P17C7 P172A P172B *****</p>		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>shift, until: 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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200 \text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage  OR  accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C45678910R clutch, 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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C45678910R clutch, 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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.000$ seconds  25 milliseconds  12.5 milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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



210BDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC or GR10 C2 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

210BDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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

21OBDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5 C1356789 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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

21OBDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 C23467810R 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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



21OBDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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

210BDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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

21OBDG03D TCM Summary Tables

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

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR 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. OR Axis data fault – pressure</p>	= FALSE	<p>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.</p> <p>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.</p>		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

210BDG03D TCM Summary Tables

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

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n 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 raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETR S = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips



# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/Switch Circuit Range/Performance	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	<p>Mode valve A position sensor</p> <p>mode valve A steady state delay</p> <p>line pressure line pressure action</p> <p>(ETRS commanded direction park servo)</p> <p>OR</p> <p>(ETRS commanded direction park servo)</p> <p>OR</p> <p>((ETRS commanded direction park servo)</p> <p>mode valve A fail timer</p> <p>clutch slip)</p> <p>set sensor fault to TRUE</p>	<p>≠ <b>Mode Valve A Final State</b></p> <p>&gt;= <b>Mode Vlv StdySt Park Dly Lim</b></p> <p>&gt;= 450.00</p> <p>≠ diagnostic min line</p> <p>= PARK</p> <p>= PARK</p> <p>= NeutLo</p> <p>≠ OUT OF PARK</p> <p>= Drive or Reverse</p> <p>≠ PARK</p> <p>&gt;= <b>Mode Valve A StdySt Rmdl Lim</b></p> <p>= no slip detected</p>	<p>park servo enable</p> <p>ETRS system type is internal ETRS</p> <p>battery voltage for battery voltage time (engine mode run OR hydraulic pressure available)</p> <p>auto stop active</p> <p>diagnostic monitor enable</p> <p>ETRS commanded direction</p> <p>P27EE fault active</p> <p>P27EB fault active</p> <p>P27ED fault active</p> <p>P18AB test fail this key on</p> <p>P18AA test fail this key on</p> <p>P27EC test fail this key on</p> <p>mode valve steady state clutch slip = slip detected when:</p> <p>IF</p> <p>(commanded or attained gear</p> <p>C1 clutch slip speed validity)</p> <p>ELSE IF</p> <p>(range shift state active clutch control (turbine speed OR turbine speed) gear slip timer)</p> <p>ELSE</p> <p>(commanded gear slip AND gear slip timer)</p> <p>mode valve steady state</p>	<p>= 1 Boolean</p> <p>= CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts</p> <p>≥ 1.000 seconds</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p>= 1 Boolean</p> <p>= ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= 1 FW</p> <p>= FALSE</p> <p>= clutch control ≠ GSCR</p> <p>&gt; upper bound</p> <p>&lt; lower bound</p> <p>&gt;= 0.10</p> <p>&gt;= 150.00</p> <p>&gt;= 0.10</p>	<p>IF mode valve A sensor fault = TRUE, set DTC fault active</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	= TRUE  < 200.00 >= 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 >= 400.00  > 5.00  35.00  >= 0.05		
			Mode valve A sensor position  mode valve A state attained mode valve A transition  ((ETRS commanded direction ETRS range line pressure command mode valve A pressure park servo)	≠ <b>Mode Valve A Final State</b>  = FALSE  = FALSE  = DRIVE  = PARK > 99.00 > 195.00 = OUT OF PARK	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time (engine mode run OR hydraulic pressure available) auto stop active diagnostic monitor enable  ((Driver command P2812 Fault Active P2815 Fault Active	= 1 Boolean = CeTRGR_e_InternalETR S  ≥ 8.00 volts ≥ 1.000 seconds = TRUE = TRUE  = FALSE = 1 Boolean  = Park	IF mode valve A sensor fault = TRUE, set DTC fault active  update rate 6.25 milliseconds	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>OR</p> <p>(ETRS commanded direction ETRS range mode valve A pressure park servo))</p> <p>mode valve A transition delay</p> <p>set mode valve A sensor fault</p>	<p>= PARK</p> <p>= DRIVE</p> <p>&lt; 25.00</p> <p>= PARK</p> <p>&gt;=</p> <p>ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)</p> <p>= TRUE</p>	<p>P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))</p> <p>ETRS commanded direction</p> <p>Mode enable valve stuck on test</p> <p>P27EE fault active P27EB fault active P27ED fault active P18AB test fail this key on P18AA test fail this key on P27EC test fail this key on</p> <p>Mode valve A state attained = TRUE when: Mode valve A sensor position Mode valve sensor position</p> <p>(mode valve A transition OR <b>Mode Valve A Trnstn State</b> )</p> <p>Mode valve A transition = TRUE when:</p>	<p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>≠ Park</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>≠ ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= mode valve A command position</p> <p>=</p> <p><b>Mode Valve A Final State</b></p> <p>= TRUE</p> <p>=</p> <p><b>Mode Valve A Final State</b></p>		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Mode valve A sensor position	= Mode Valve A Trnsth State		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/Switch Circuit/Open	P27EF	The diagnostic monitor detects an illegal voltage on the mode valve B position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/Switch Circuit Range/Performance	P27F0	Sensor signal fails to transition when solenoid mode valve control commands to PARK, REVERSE, NEUTRAL HI, NEUTRAL LO, NEUTRAL SHIFT or DRIVE occur.	<p>Mode valve B position sensor</p> <p>mode valve B steady state delay</p> <p>line pressure line pressure action</p> <p>(ETRS commanded direction park servo)</p> <p>OR</p> <p>(ETRS commanded direction park servo)</p> <p>OR</p> <p>((ETRS commanded direction park servo) mode valve A fail timer</p> <p>clutch slip)</p> <p>set mode valve B sensor fault to TRUE</p>	<p>≠ <b>Mode Valve B Final State</b></p> <p>&gt;= <b>Mode Vlv StdySt Park Dly Lim</b></p> <p>&gt;= 450.00</p> <p>≠ diagnostic min line</p> <p>= PARK</p> <p>= PARK</p> <p>= NeutLo</p> <p>≠ OUT OF PARK</p> <p>= Drive or Reverse</p> <p>≠ PARK</p> <p>&gt;= <b>Mode Valve B steady state turbine speed delay limit</b></p> <p>= no slip detected</p>	<p>park servo enable ETRS system type is internal ETRS</p> <p>battery voltage for battery voltage time (engine mode run OR hydraulic pressure available)</p> <p>auto stop active diagnostic monitor enable</p> <p>ETRS commanded direction</p> <p>P27F2 fault active</p> <p>P27EF fault active</p> <p>P27F1 fault active</p> <p>P18AD test fail this key on</p> <p>P18AC test fail this key on</p> <p>P27F0 test fail this key on</p> <p>mode valve steady state clutch slip = slip detected when:</p> <p>IF (commanded or attained gear C1 clutch slip speed validity)</p> <p>ELSE IF (range shift state active clutch control (turbine speed OR turbine speed) gear slip timer)</p> <p>ELSE (commanded gear slip AND gear slip timer)</p>	<p>= 1 Boolean</p> <p>= CeTRGR_e_InternalETRS</p> <p>≥ 8.00 volts</p> <p>≥ 1.000 seconds</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p>= 1 Boolean</p> <p>= ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= 1 FW</p> <p>= FALSE</p> <p>= clutch control ≠ GSCR</p> <p>&gt; upper bound</p> <p>&lt; lower bound</p> <p>&gt;= 0.10</p> <p>&gt;= 150.00</p> <p>&gt;= 0.10</p>	<p>IF Mode valve B sensor fault = TRUE, set DTC fault active</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mode valve steady state clutch slip = no slip detected when: IF (C1 clutch slip speed validity (C1 slip (turbine pull down OR throttle position %)) ELSE IF (range shift state active clutch control (turbine speed OR turbine speed )) ELSE (commanded gear slip (turbine pull down OR (throttle position % OR engine torque))) AND gear slip timer	= TRUE  < 200.00 >= 400.00  > 5.00  = clutch control ≠ GSCR < upper bound  > lower bound  < 150.00 >= 400.00  > 5.00  > 35.00  >= 0.05		
			Mode valve B sensor position  mode valve B state attained mode valve B transition  (ETRS commanded direction ETRS range park servo	≠ <b>Mode Valve B Final State</b>  = FALSE  = FALSE  = Park  ≠ Park = PARK	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time (engine mode run OR hydraulic pressure available) auto stop active diagnostic monitor enable  ((Driver command	= 1 Boolean = CeTRGR_e_InternalETR S  ≥ 8.00 volts ≥ 1.000 seconds = TRUE = TRUE  = FALSE = 1 Boolean	IF mode valve B sensor fault = TRUE, set DTC fault active  update rate 6.25 milliseconds	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			min line pressure command mode valve B pressure)  OR  (ETRS commanded direction ETRS range Line pressure command mode valve B pressure command park servo)  Mode valve B transition delay timer          set mode valve B sensor fault	= FALSE  <= 25.00     = Reverse, NeutHi, Neutshf, or NeutLo = Park >= 99.00 >= 295.00  = OUT OF PARK  >= ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)  = TRUE	P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active)  OR  (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))  ETRS commanded direction  Mode enable valve stuck on test  P27EF fault active P27F1 fault active P27F2 fault active P18AC test fail this key on P18AD test fail this key on P27F0 test fail this key on  Mode valve B state attained = TRUE when: (Mode valve B sensor position  Mode valve B position AND (Mode valve B transition OR  <b>Mode Valve B Trnstn State</b> ))	= Park = FALSE = FALSE = FALSE = FALSE  ≠ Park = FALSE = FALSE = FALSE  = FALSE = FALSE  ≠ ETRS diagnostic range  = FALSE  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE  = <b>Mode Valve B Final State</b> = Mode valve command  = TRUE		

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Mode valve B transition = TRUE when: Mode valve B transition	= Mode Valve B Final State  = Mode Valve B Trnstn State		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Control B Position Sensor/ Switch Circuit Low	P27F1	The diagnostic monitor detects a ground short or open circuit fault on the mode valve B position sensor circuit.	raw sensor voltage	> 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETR S = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmissio n Range Control B Position Sensor/ Switch Circuit High	P27F2	The diagnostic monitor detects a short to voltage on the mode valve B position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 8.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETR S = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample  6.25 millisecond update rate	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage  OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off	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 TCC control mode  TCC slip speed error = TCC slip speed - TCC command slip speed  else if TCC control mode torque convert slip = engine speed - transmission input shaft speed  then update fail time 25 millisecond update rate	= 0 Boolean  = ON mode (controlled slip mode) ≥ <b>P2817 TCC stuck off fail TCC slip speed</b> see supporting table  = LOCK ≥ 130.0 RPM	diagnostic monitor enable   TCC command capacity  TCC command pressure  (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current)  (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean   ≥ 0.00 %  ≥ 800.0 kPa  ≠ TCC control mode current ≠ ON mode (controlled slip mode) ≠ LOCK  = ON mode (controlled slip mode) = LOCK  = 1 Boolean  = 1 Boolean  ≥ 500.0 RPM	fail time ≥ 2.500 seconds increment fail count fail count ≥ 3 counts 25 millisecond update rate  TCC command capacity time ≥ 0.00 seconds  TCC command pressure time ≥ 2.00 seconds          engine speed time ≥ <b>engine speed time for transmission hydraulic pressure available</b>	Type B, 2 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service fast learn active battery voltage  run crank voltage  P281B falut active P281D falut active P281E falut active P0722 fault pending P0723 fault pending P0716 fault pending P0717 fault pending P07BF fault pending P07C0 fault pending (PTO active OR PTO disable calibration) accelerator pedal position accelerator pedal position range shift state transmission fluid temperature transmission fluid temperature engine torque engine torque P2817 test fail this key on (TCC control mode OR TCC control mode) break latch state (clutch select valve solenoid) attained gear  attained gear slip  DTCs not fault active	= FALSE ≥ 9.00 volts  ≥ 9.00 volts  = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1 Boolean ≥ 8.0 % ≤ 100.0 % = range shift complete ≥ -6.66 °C  ≤ 130.0 °C ≥ 50.0 Nm ≤ 8,191.8 Nm = FALSE = ON mode (controlled slip mode) = LOCK = disabled (clutch select valve not transitioning) ≥ CeCGSR_e_CR_Third  ≤ 25 RPM  AcceleratorPedalFailure EngineTorqueEstInaccura te	see supporting table  battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GF9 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve solenoid stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve solenoid is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	while control valve test time timing down: rate of change of torque convert slip speed = (ABS (current loop value torque convert slip speed - previous loop value torque convert slip speed) / 25 milliseconds) when clutch select valve solenoid multiplexed to TCC hydraulic AND torque convert slip speed = ABS(engine speed - transmission input shaft speed) AND torque convert slip speed = engine speed - transmission input shaft speed torque convert slip speed torque convert slip speed THEN increment fail time 25 millisecond update rate	$\geq$ <b>P2818 torque convert derivative slip speed fail threshold</b> see supporting table  $\leq$ <b>P0741 (GF9 specific) TCC slip speed crash RPM</b>  $\geq -50.0 \text{ RPM}$ $\leq 30.0 \text{ RPM}$	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed  service fast learn active battery voltage  run crank voltage  P281B falut active P281D falut active P281E falut active  PRNDL PRNDL transmission fluid temperature transmission fluid	$= 1 \text{ Boolean}$ $= 1 \text{ Boolean}$ $= 1 \text{ Boolean}$ $\geq 500.0 \text{ RPM}$  $= \text{FALSE}$ $\geq 9.00 \text{ volts}$  $\geq 9.00 \text{ volts}$  $= \text{FALSE}$ $= \text{FALSE}$ $= \text{FALSE}$  $\neq \text{NEUTRAL}$ $\neq \text{REVERSE}$ $\geq -6.66 \text{ }^{\circ}\text{C}$ $\leq 130.00 \text{ }^{\circ}\text{C}$	fail time $\geq 1.500$ seconds increment fail count fail count $\geq 4$ counts 25 millisecond update rate  engine speed time $\geq$ <b>engine speed time for transmission hydraulic pressure available</b> see supportinf table  battery voltage time $\geq 0.100$ seconds run crank voltage time $\geq 0.100$ seconds	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature accelerator pedal position accelerator pedal position vehicle speed vehicle speed TCC command mode break latch state (clutch select valve solenoid) P0722 fault pending P0723 fault pending P0716 fault pending P0717 fault pending P07BF fault pending P07C0 fault pending (PTO active OR PTO disable calibration) transmission fluid temperature transmission fluid temperature engine torque engine torque P2818 test fail this key on vehicle speed engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration) (misfire requests TCC off OR misfire TCC off calibration) (clutch control solenoid stuck on OR stuck OFF intrusive shift active) P0746 fault pending P0747 fault pending P0776 fault pending	≥ 0.00 % ≤ 1.00 % ≥ 3.0 KPH ≤ 9.5 KPH = OFF ≠ disabled (clutch select valve transitioning) = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1 Boolean ≥ -6.66 °C ≤ 130.00 °C ≥ 55.0 Nm ≤ 800.0 Nm = FALSE ≤ 45.0 KPH ≥ 400.0 RPM ≤ 5,500.0 RPM ≤ 95.0 % = FALSE = FALSE = 0 Boolean = FALSE = 0 Boolean = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777 fault pending P0796 fault pending P0797 fault pending P2714 fault pending P2715 fault pending P2723 fault pending P2724 fault pending P2732 fault pending P2733 fault pending P2820 fault pending P2821 fault pending vehicle speed accelerator pedal position hysteresis  when: break latch state (clutch select valve solenoid) previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, stuck on test time must time down from calibration value to zero (0.0) seconds  break latch state (clutch select valve solenoid) AND  previous break latch state (clutch select valve solenoid) THEN initialize control valve test time, control valve test time must time down from calibration value to zero (0.0) seconds	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≤ 8.0 KPH ≥ 4.0 % > 1.0 %  = disabled (clutch select valve not transitioning) = complete (clutch select valve transition complete)  = <b>P2818 stuck on test time</b> see supporting tables  = clutch select valve solenoid multiplexed to TCC hydraulic  = disabled (clutch select valve not transitioning)  = <b>P2818 (GF9 specific)</b> <b>control valve test time</b> see supporting tables		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccuracy P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit  Increment fail time	$\geq 200\text{ K } \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage  OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type B, 2 Trips



## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON    = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p> <p>Increment fail time</p>	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p><math>\geq 9.00</math> volts and <math>\leq 32.00</math> volts</p> <p><math>\geq 5.00</math> volts</p> <p>= TRUE</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time <math>\geq 0.30</math> seconds out of sample time <math>\geq 0.50</math> seconds</p> <p><math>\geq 1.00</math> seconds</p> <p><math>\geq 25</math> milliseconds</p> <p><math>\geq 12.5</math> milliseconds</p>	Type B, 2 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off (GF9)	P2820	<p>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 clutch select valve solenoid failed hydraulically off. The clutch select valve is used to route hydraulic fluid to, either, the selectable one way clutch hydraulic circuit used to attain transmission 1st gear lock state, or, to the C6 - C6789 clutch hydraulic circuit necessary for transmission higher gear states.</p> <p>When the clutch select valve is failed hydraulically off, and transmission is in 1st gear lock state, it is possible to measure low C6 - C6789 clutch slip speed or 6th gear transmission ratio, since hydraulic fluid is routed to the clutch C6 - C6789. This can be determined based on transmission lever node design, the</p>	<p>(gear ratio AND gear ratio) OR C6 clutch slip speed</p> <p>update fail time 6.25 milliscond update</p>	<p>≤ 1.700 ≥ 1.200 ≤ 20.0 RPM</p>	<p>***** system-level enables:  use battery voltage calibration is FALSE  OR  (use battery voltage calibration is TRUE  AND  battery voltage)  use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)  TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled  TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled  service fast learn active</p>	<p>*****  = 1 Boolean  = 1 Boolean  ≥ 9.00 volts = 1 Boolean = 1 Boolean ≥ 9.00 volts  = TRUE Boolean  = TRUE Boolean = FALSE Boolean</p>	<p>fail time ≥ 0.250 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>transmission input shaft speed, the transmission output shaft speed, and one transmission intermediate shaft speed, while not commanding 6th-9th gear.</p> <p>This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.</p>			<p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>diagnostic monitor enabled</p> <p>transmission output shaft speed</p> <p>transmission fluid temperature</p> <p>transmission fluid temperature</p> <p>(command gear AND attained gear) OR (attained gear AND SOWC state)</p> <p>C6 clutch slip speed valid</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= 1 (1 to enable, 0 to disable)</p> <p>≥ 35 RPM</p> <p>≥ -256.00 °C</p> <p>≤ 130.0 °C</p> <p>= 1st lock</p> <p>= 1st lock</p> <p>= 2nd lock</p> <p>= APPLY COMPLETE</p> <p>= TRUE</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>P2534 P0707 P0708 P0716 P0717 P07C0</p>		

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on	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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA  P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Stuck On (GF9)	P2821	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 select pressure control solenoid must be hydraulically off and the clutch select valve in the off state, to allow hydraulic fluid supply to the C3 (CB38) or C4 (C4) or C5 (C57R) clutches, such that when activated, commanded gear 3rd or 4th or 5th can be attained. With the clutch select valve pressure control solenoid failed hydraulically on, commanded gear 3rd or 4th or 5th cannot be attained. In the failure mode, the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM, when commanding 3rd or 4th or 5th gear, but due to the clutch select pressure control solenoid failed hydraulically on and not	Cx clutch slip speed fail compare C3 (CB38) OR C4 (C4) OR C5 (C57R) update Cx clutch slip speed fail time 6.25 milliscond update  once intrusive gear is commanded and clutch select stuck on test active remains and Cx clutch fail count limit occurs, increment clutch select valve solenoid stuck on fail count and time up clutch select stuck on test gear time 6.25 milliscond update	 ≥ 200.0 RPM ≥ 200.0 RPM ≥ 200.0 RPM       = TRUE			Cx clutch slip speed fail time ≥  (C3 (CB38) 1.00 seconds OR C4 (C4) 1.00 seconds OR C5 (C57R) 1.00 seconds)  update Cx fail count,  Cx fail count ≥ (C3 (CB38) 3 counts OR C4 (C4) 3 counts OR C5 (C57R) 3 counts)  Cx clutch fail count limit occurs 6.25 milliscond update  clutch select valve solenoid stuck on fail count ≥ 2 counts OR clutch select stuck on test gear time ≥ 9.00 seconds	Type A, 1 Trips

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>individual clutch control faults. It is thus necessary, when individual clutch slip occurs in 3rd or 4th or 5th gear and counted toward the clutch pressure control solenoid stuck on failure, for an intrusive gear commanded from 3rd or 4th or 5th to verify the clutch slip in the remaining gear states. The individual clutch slip that occurs in those intrusive gears, 3rd or 4th or 5th, is also counted toward the clutch pressure control solenoid stuck on failure. As individual clutch slip is accumulated in each commanded gear 3rd or 4th or 5th, that failure time is the verification of the clutch pressure control solenoid failed hydraulically on.</p> <p>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</p>			<p>***** system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage</p> <p>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>***** diagnostic monitor enable</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>≥ 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean = FALSE Boolean</p> <p>= TRUE</p> <p>***** = 1 Boolean</p>	<p>6.25 milliscond update</p> <p>battery voltage time ≥ 0.100 seconds</p> <p>run crank voltage time ≥ 0.100 seconds</p>	

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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 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 select pressure control solenoid is failed hydraulically on, C3 (CB38) or C4 (C4) or C5 (C57R) clutches cannot maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable.</p> <p>The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is</p>			<p>P2821 test fail this key on</p> <p>test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state</p> <p>clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete</p> <p>Cx indicates any one of the 3 clutches: C3 (CB38) OR C4 (C4) OR C5 (C57R)</p> <p>enable Cx clutch slip speed fail compare when: diagnostic clutch test Cx ((startle mitigation active OR (startle mitigation active</p>	<p>= FALSE</p> <p>= 1 Boolean = forward gear</p> <p>= 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST</p> <p>= range shift completed</p> <p>= TRUE</p> <p>≠ range shift completed</p> <p>= HOLDING CLUTCH = FALSE = TRUE</p>	<p>initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete</p>	



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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>active. 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, which, must take priority over this clutch select pressure control solenoid stuck off diagnostic monitor. All clutch pressure control 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 a clutch pressure control solenoid stuck off test is disabled.</p> <p>This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.</p>			<p>AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed Cx clutch slip speed valid, all speed sesnors are functional for lever node cluth slip speed calculation</p> <p>accelerator pedal position engine speed</p> <p>diagnostic clutch test Cx set to HOLDING CLUTCH when: clutch solenoid test state ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) Cx clutch pressured map</p> <p>***** clutch select stuck on test active set to TRUE when:</p>	<p>≠ initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 Boolean</p> <p>= FALSE</p> <p>≥ 89.0 RPM</p> <p>≥ 2.00 % ≥ 1,500.0 RPM</p> <p>= NEUTRAL TEST = FALSE</p> <p>= TRUE</p> <p>≠ initial startle mitigation gear</p> <p>= mapped to line pressure, Cx clutch pressure has transtioned from off-applying-applied</p> <p>*****</p>		

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>command gear clutch control solenoid test state any Cx clutch fail count limit occurs break latch state, clutch select valve hydraulic latch fluid is applied, hydraulic latch fluid force balance acts with clutch select valve return spring, to force the clutch select valve to the off position in normal operation, allowing hydraulic fluid to C3 (CB38) C4 (C4) and C5 (C57R) clutches</p> <p>clutch select stuck on test active driver direction (PRNDL) change request, select intrusive gear to verify clutch select valve solenoid when HOLDING CLUTCH: C3 (CB38) C4 (C4) C5 (C57R) enable clutch select stuck on test gear time</p> <p>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</p>	<p>≠ REVERSE = NEUTRAL TEST</p> <p>= complete</p> <p>= TRUE</p> <p>= FALSE</p> <p>= CeCGSR_e_Fourth = CeCGSR_e_Fifth = CeCGSR_e_Fourth</p>		

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>P2715 P2724 P2733 P2821</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not test fail this key on</p> <p>DTCs not fault active</p>	<p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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  Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short  Increment fail time	$\leq 0.5 \Omega$ impedance between signal and controller ground	battery voltage  (run crank voltage OR accessory voltage active)  diagnostic monitor enable calibration  (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)  OR  (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)  OR  (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	$\geq 9.00$ volts and $\leq 32.00$ volts  $\geq 5.00$ volts  = TRUE  = 1 (1 is enable, 0 is disable)  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON  = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time $\geq 0.30$ seconds out of sample time $\geq 0.50$ seconds  $\geq 1.00$ seconds  $\geq 25$ milliseconds  $\geq 12.5$ milliseconds	Type A, 1 Trips

## 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p> <p>Increment fail time</p>	$\leq 0.5 \Omega$ impedance between signal and controller voltage source	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p><math>\geq 9.00</math> volts and <math>\leq 32.00</math> volts</p> <p><math>\geq 5.00</math> volts</p> <p>= TRUE</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time <math>\geq 0.30</math> seconds out of sample time <math>\geq 0.50</math> seconds</p> <p><math>\geq 1.00</math> seconds</p> <p><math>\geq 25</math> milliseconds</p> <p><math>\geq 12.5</math> milliseconds</p>	Type A, 1 Trips

# 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Stall Prevention Active Signal Counter Incorrect	P30BD	The diagnostic monitor detects an alive rolling count error in the CAN frame containing the engine stall protection signal value. The alive rolling count sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the alive rolling count in this sequence manner. The receiving controller compares the most recent received alive rolling count value to the previous value plus one. If the values are not equal, an alive rolling count error has occurred. If continuous alive rolling count errors occur the DTC is set.	rolling count value received from ECM and expected TCM calculated value not equal	= TRUE	Loop rate calibration either 10 milliseconds or 12.5 milliseconds  service mode \$04 active battery voltage battery voltage time  engine stall protection ECM frame recieved	= CeCFMD_e_DEC_Time Base_12p5  = FALSE ≥ 11.00 volts ≥ 300.000 seconds  = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds  before the sample time of is reached	3 counts (equivalent to 0.04 seconds)  0.81 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Run/Crank Ignition voltage  Power Mode  Off Cycle Enable Criteria:  KeCAND_b_OffKeyCycle DiagEnbl  Ignition Accessory Line and Battery Voltage  General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds  CAN hardware is bus OFF for	Not Active on Current Key Cycle  Enabled  Not Active  Not Active  > 6.41 Volts  = run  = 1 ( 1 indicates enabled)  = Active  > 11.00 Volts        > 0.1625 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	<p>Message is not received from controller for</p> <p>Message \$0BE</p> <p>Message \$0C9</p> <p>Message \$18E</p> <p>Message \$1A1</p> <p>Message \$1A3</p> <p>Message \$1AA</p> <p>Message \$1BA</p> <p>Message \$287</p> <p>Message \$3D1</p> <p>Message \$3E9</p> <p>Message \$4C1</p> <p>Message \$4C7</p> <p>Message \$4D1</p> <p>Message \$4F1</p> <p>Message \$589</p>	<p>≥ 0.50 seconds</p> <p>≥ 0.50 seconds</p> <p>≥ 0.50 seconds</p> <p>≥ 0.50 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p> <p>≥ 12.00 seconds</p>	<p>General Enable Criteria:</p> <p>U0073</p> <p>Normal CAN transmission on Bus A</p> <p>Device Control</p> <p>High Voltage Virtual Network Management</p> <p>Ignition Voltage Criteria:</p> <p>Run/Crank Ignition voltage</p> <p>Power Mode</p> <p>Off Cycle Enable Criteria:</p> <p>KeCAND_b_OffKeyCycle DiagEnbl</p> <p>Ignition Accessory Line and Battery Voltage</p> <p>General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for &gt; 5.0000 seconds</p> <p>Power Mode is in accessory or run or crank and High Voltage Virtual</p>	<p>Not Active on Current Key Cycle</p> <p>Enabled</p> <p>Not Active</p> <p>Not Active</p> <p>&gt; 6.41 Volts</p> <p>= run</p> <p>= 1 (1 indicates enabled)</p> <p>= Active</p> <p>&gt; 11.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips



210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for  U0100  ECM	> 0.4000 seconds  Not Active on Current Key Cycle  is present on the bus		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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 (Non-OBD Module ID 243).	<p>Message is not received from controller for</p> <p>Message \$0C1</p> <p>Message \$0C5</p> <p>Message \$1E9</p> <p>Message \$2F9</p>	<p>≥ 0.5 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p>	<p>General Enable Criteria:</p> <p>U0073</p> <p>Normal CAN transmission on Bus A</p> <p>Device Control</p> <p>High Voltage Virtual Network Management</p> <p>Ignition Voltage Criteria:</p> <p>Run/Crank Ignition voltage</p> <p>Power Mode</p> <p>Off Cycle Enable Criteria:</p> <p>KeCAND_b_OffKeyCycle DiagEnbl</p> <p>Ignition Accessory Line and Battery Voltage</p> <p>General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for &gt; 5.0000 seconds</p> <p>Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for</p>	<p>Not Active on Current Key Cycle</p> <p>Enabled</p> <p>Not Active</p> <p>Not Active</p> <p>&gt; 6.41 Volts</p> <p>= run</p> <p>= 1 (1 indicates enabled)</p> <p>= Active</p> <p>&gt; 11.00 Volts</p> <p>&gt; 0.4000 seconds</p>	Diagnostic runs in 12.5 ms loop	Emissio ns Neutral Diagnost ic – Type C

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0121  Anti-Lock Brake System Control Module	Not Active on Current Key Cycle  is present on the bus		

## 21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	<p>Message is not received from controller for</p> <p>Message \$0F1</p> <p>Message \$12A</p> <p>Message \$1F1</p> <p>Message \$1F3</p> <p>Message \$4E1</p> <p>Message \$4E9</p>	<p>≥ 0.5 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p> <p>≥ 12.0 seconds</p>	<p>General Enable Criteria:</p> <p>U0073</p> <p>Normal CAN transmission on Bus A</p> <p>Device Control</p> <p>High Voltage Virtual Network Management</p> <p>Ignition Voltage Criteria:</p> <p>Run/Crank Ignition voltage</p> <p>Power Mode</p> <p>Off Cycle Enable Criteria:</p> <p>KeCAND_b_OffKeyCycle DiagEnbl</p> <p>Ignition Accessory Line and Battery Voltage</p> <p>General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for &gt; 5.0000 seconds</p> <p>Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for</p>	<p>Not Active on Current Key Cycle</p> <p>Enabled</p> <p>Not Active</p> <p>Not Active</p> <p>&gt; 6.41 Volts</p> <p>= run</p> <p>= 1 (1 indicates enabled)</p> <p>= Active</p> <p>&gt; 11.00 Volts</p> <p>&gt; 0.4000 seconds</p>	Diagnostic runs in 12.5 ms loop	Emissio ns Neutral Diagnost ic – Type C

21OBDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0140  Body Control Module	Not Active on Current Key Cycle  is present on the bus		

# 210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A	Message is not received from controller for  Message \$3CF	  ≥ 10.00 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Run/Crank Ignition voltage  Power Mode  Off Cycle Enable Criteria:  KeCAND_b_OffKeyCycle DiagEnbl  Ignition Accessory Line and Battery Voltage  General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds  Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	Not Active on Current Key Cycle  Enabled  Not Active  Not Active   > 6.41 Volts  = run   = 1 (1 indicates enabled)  = Active  > 11.00 Volts         > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

210BDG03D TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0146	Not Active on Current Key Cycle		
					Gateway A	is present on the bus		

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

## P0606\_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

## P0606\_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

**Initial Supporting table - P0606 enable (CPU, 10 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 10 msec

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, 100 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 100 msec

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, 12.5 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 12.5 msec

y/x	1
1	1

**Initial Supporting table - P0606 enable (CPU, 20 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 20 msec

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, 25 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 25 msec

y/x	1
1	1

**Initial Supporting table - P0606 enable (CPU, 40 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 40 msec

y/x	1
1	0



## Initial Supporting table - P0606 enable (CPU, 5 msec)

**Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event

**Value Units:** Boolean

**X Unit:** CPU

**Y Units:** 50 msec

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, 50 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 50 msec

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, 6.25 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** 50 msec

y/x	1
1	1

**Initial Supporting table - P0606 enable (CPU, 80 msec)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean**X Unit:** CPU**Y Units:** EventA

y/x	1
1	0

## Initial Supporting table - P0606 enable (CPU, EventA)

**Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event

**Value Units:** Boolean

**X Unit:** CPU

**Y Units:** EventB

y/x	1
1	0

## Initial Supporting table - P0606 enable (CPU, EventB)

**Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event

**Value Units:** Boolean

**X Unit:** CPU

**Y Units:** EventB

y/x	1
1	0

**Initial Supporting table - P0606 enable (CPU, EventC)****Description:** P0606 program sequence watch diagnostic monitor enable, function of CPU and loop time or event**Value Units:** Boolean

y/x	1
1	1

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

## P0606\_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

## P0606\_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

## Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

## Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

**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	0.300	0.300	0.275	0.200	0.200

## Initial Supporting table - NumClchTieUp

**Description:** NumClchTieUp**Value Units:** minimum # of clutches**X Unit:** command gear or attained gear**Y Units:** not applicable, no units, single row table f(gear)**NumClchTieUp - 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
1	2	3	2	2	2	2	2

**NumClchTieUp - 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
1	2	2	1	1	1	1	1

**NumClchTieUp - Part 3**

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - Part 4**

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wN C	CeCGSR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCGSR_e_Park_wN C3	CeCGSR_e_Park_wN C4
1	1	1	3	2	2	2	2

**NumClchTieUp - Part 5**

y/x	CeCGSR_e_Park_wN C5	CeCGSR_e_Park_wN C6	CeCGSR_e_Park_wN C7	CeCGSR_e_Park_wN C1C2	CeCGSR_e_Park_wN C2C3	CeCGSR_e_Park_wN C2C4	CeCGSR_e_Park_wN C2C5
1	2	2	2	1	1	1	1

**NumClchTieUp - Part 6**

y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C2C3C4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - 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
1	1	1	2	1	1	1	1

**NumClchTieUp - Part 8**

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
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Initial Supporting table - NumClchTieUp							
1	1	1	1	1	1	1	

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

## P0606\_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

## P0606\_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

**Initial Supporting table - P0723 transmission engaged state time threshold****Description:** time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

**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	1.000	1.000

## 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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

**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	4	4

**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	2.000	2.000

**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	172.0	172.0



**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	172.0	172.0

## 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_C2 C_ClchSpdSnsr 1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

**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 - P2D2 Cltch Slip Sum

## Description:

**Value Units:** rate of change of output rpm (dn) per 25 milliseconds**X Unit:** % brake pedal position**Y Units:** not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192

## Initial Supporting table - P2D2 Decel Pressure - C1

**Description:** clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	130.9	130.9	9,999.0	337.3	401.3

## P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	130.9	337.3	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	337.3	50.0	50.0	401.3

## P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	631.9	631.9	50.0	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	337.3	401.3	9,999.0	130.9	337.3

## P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	130.9	9,999.0	50.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	337.3	50.0	50.0	401.3	631.9

## P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C1

1	631.9	50.0	130.9	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	631.9	401.3	337.3	50.0
<b>P2D2 Decel Pressure - C1 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C2

**Description:** clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	352	352	352	9,999	2,125

## P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	786	479	352	511	9,999

## P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	786	479	50	50

## P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,125

## P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	749	749	50	352	352

## P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,125	786	479	352

## P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	511	9,999	50	50	50

## P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,125	749

## P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C2

1	749	50	511	563	563
<b>P2D2 Decel Pressure - C2 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	786	479
<b>P2D2 Decel Pressure - C2 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	352	749	2,125	9,999	50
<b>P2D2 Decel Pressure - C2 - Part 12</b>					
y/x					
1					



## Initial Supporting table - P2D2 Decel Pressure - C3

**Description:** clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	243	243	243	1,267	9,999

## P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	693	245	243	245	1,295

## P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	693	354	50	50

## P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,267	50	50	9,999

## P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	661	661	50	243	243

## P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,267	9,999	693	245	243

## P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	245	1,295	50	50	50

## P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,267	50	50	9,999	661

## P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C3

1	661	50	245	270	270
<b>P2D2 Decel Pressure - C3 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	693	354
<b>P2D2 Decel Pressure - C3 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	243	661	9,999	1,267	50
<b>P2D2 Decel Pressure - C3 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C4

**Description:** clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	432	432	476	1,020	1,553

## P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	432	898	432	1,126

## P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,683	9,999	1,739	50	50

## P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,020	50	50	1,553

## P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	432	476

## P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,020	1,553	9,999	432	898

## P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	432	1,126	50	50	50

## P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,020	50	50	1,553	9,999

## P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	432	476	476
<b>P2D2 Decel Pressure - C4 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,126	1,126	1,683	9,999	1,739
<b>P2D2 Decel Pressure - C4 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	898	2,030	1,553	1,020	50
<b>P2D2 Decel Pressure - C4 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C5

**Description:** clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	138	138	138	251	313

## P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	634	9,999	672	138	251

## P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	313	634	9,999	50	50

## P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	765	50	50	1,164

## P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	138	138

## P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	251	313	634	9,999	672

## P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	138	251	50	50	50

## P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	765	50	50	1,164	9,999

## P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	138	138
<b>P2D2 Decel Pressure - C5 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	251	251	313	634	9,999
<b>P2D2 Decel Pressure - C5 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	672	9,999	1,164	765	50
<b>P2D2 Decel Pressure - C5 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C6

**Description:** clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	176	176	176	278	325

## P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	495	253	9,999	176	278

## P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	325	495	1,016	50	50

## P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

## P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	176	176

## P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	278	325	495	253	9,999

## P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	176	278	50	50	50

## P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

## P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

## Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	253	176	176
<b>P2D2 Decel Pressure - C6 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	278	278	325	495	1,016
<b>P2D2 Decel Pressure - C6 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
<b>P2D2 Decel Pressure - C6 - Part 12</b>					
y/x					
1					



## Initial Supporting table - P2D2 Decel Pressure - C7

**Description:** clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

## P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

## Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
<b>P2D2 Decel Pressure - C7 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 12</b>					
y/x					
1					

**Initial Supporting table - transmission fluid temperature warm up time****Description:****Value Units:** transmission fluid temperature normal warm 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 - 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

## P0606\_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

## 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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

## P0606\_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

## Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

## Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied



**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	0.300	0.300	0.275	0.200	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:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

## Initial Supporting table - NumClchTieUp

**Description:** NumClchTieUp**Value Units:** minimum # of clutches**X Unit:** command gear or attained gear**Y Units:** not applicable, no units, single row table f(gear)**NumClchTieUp - 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
1	2	3	2	2	2	2	2

**NumClchTieUp - 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
1	2	2	1	1	1	1	1

**NumClchTieUp - Part 3**

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - Part 4**

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

**NumClchTieUp - 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
1	2	2	2	1	1	1	1

**NumClchTieUp - 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_wNC2C3C4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - 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
1	1	1	2	1	1	1	1

**NumClchTieUp - Part 8**

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
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Initial Supporting table - NumClchTieUp							
1	1	1	1	1	1	1	

**Initial Supporting table - P0723 transmission engaged state time threshold****Description:** time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

**Initial Supporting table - P0741 (GF9 specific) TCC slip speed crash RPM****Description:** RPM limit used to establish slip crashed when TCC oil became available**Value Units:** RPM**X Unit:** % accelerator position

y/x	0.00	15.00	25.00	50.00	75.00
1	100	100	160	233	300

**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	1.000	1.000

## 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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR-Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1



**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	4	4

**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	2.000	2.000

**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	172.0	172.0

**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	172.0	172.0

## 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_C2 C_ClchSpdSnsr 1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

**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 - 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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

**Initial Supporting table - P2818 (GF9 specific) control valve test time**

**Description:** Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

**Value Units:** seconds

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100



**Initial Supporting table - P2818 stuck on test time**

**Description:** Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

**Value Units:** seconds

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

## Initial Supporting table - P2818 torque convert derivative slip speed fail threshold

**Description:** The fail threshold, rate of change of torque converter slip speed, at which the torque convert clutch is considered stuck on.

**Value Units:** RPM/second

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
0	-600.0	-600.0	-600.0
15	-600.0	-600.0	-600.0
25	-900.0	-900.0	-900.0
50	-1,200.0	-1,200.0	-1,200.0
75	-1,500.0	-1,500.0	-1,500.0

## Initial Supporting table - P2D2 Cltch Slip Sum

## Description:

**Value Units:** rate of change of output rpm (dn) per 25 milliseconds**X Unit:** % brake pedal position**Y Units:** not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192

## Initial Supporting table - P2D2 Decel Pressure - C1

**Description:** clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	130.9	130.9	9,999.0	337.3	401.3

## P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	130.9	337.3	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	337.3	50.0	50.0	401.3

## P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	631.9	631.9	50.0	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	337.3	401.3	9,999.0	130.9	337.3

## P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	130.9	9,999.0	50.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	337.3	50.0	50.0	401.3	631.9

## P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C1

1	631.9	50.0	130.9	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	631.9	401.3	337.3	50.0
<b>P2D2 Decel Pressure - C1 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C2

**Description:** clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	352	352	352	9,999	2,125

## P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	786	479	352	511	9,999

## P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	786	479	50	50

## P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,125

## P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	749	749	50	352	352

## P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,125	786	479	352

## P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	511	9,999	50	50	50

## P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,125	749

## P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C2

1	749	50	511	563	563
<b>P2D2 Decel Pressure - C2 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	786	479
<b>P2D2 Decel Pressure - C2 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	352	749	2,125	9,999	50
<b>P2D2 Decel Pressure - C2 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C3

**Description:** clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	243	243	243	1,267	9,999

## P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	693	245	243	245	1,295

## P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	693	354	50	50

## P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,267	50	50	9,999

## P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	661	661	50	243	243

## P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,267	9,999	693	245	243

## P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	245	1,295	50	50	50

## P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,267	50	50	9,999	661

## P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C3

1	661	50	245	270	270
<b>P2D2 Decel Pressure - C3 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	693	354
<b>P2D2 Decel Pressure - C3 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	243	661	9,999	1,267	50
<b>P2D2 Decel Pressure - C3 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C4

**Description:** clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	432	432	476	1,020	1,553

## P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	432	898	432	1,126

## P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,683	9,999	1,739	50	50

## P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,020	50	50	1,553

## P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	432	476

## P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,020	1,553	9,999	432	898

## P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	432	1,126	50	50	50

## P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,020	50	50	1,553	9,999

## P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	432	476	476
<b>P2D2 Decel Pressure - C4 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,126	1,126	1,683	9,999	1,739
<b>P2D2 Decel Pressure - C4 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	898	2,030	1,553	1,020	50
<b>P2D2 Decel Pressure - C4 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C5

**Description:** clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	138	138	138	251	313

## P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	634	9,999	672	138	251

## P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	313	634	9,999	50	50

## P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	765	50	50	1,164

## P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	138	138

## P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	251	313	634	9,999	672

## P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	138	251	50	50	50

## P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	765	50	50	1,164	9,999

## P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	138	138
<b>P2D2 Decel Pressure - C5 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	251	251	313	634	9,999
<b>P2D2 Decel Pressure - C5 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	672	9,999	1,164	765	50
<b>P2D2 Decel Pressure - C5 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C6

**Description:** clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	176	176	176	278	325

## P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	495	253	9,999	176	278

## P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	325	495	1,016	50	50

## P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

## P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	176	176

## P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	278	325	495	253	9,999

## P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	176	278	50	50	50

## P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

## P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	253	176	176
<b>P2D2 Decel Pressure - C6 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	278	278	325	495	1,016
<b>P2D2 Decel Pressure - C6 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
<b>P2D2 Decel Pressure - C6 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C7

**Description:** clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

## P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
<b>P2D2 Decel Pressure - C7 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 12</b>					
y/x					
1					

**Initial Supporting table - transmission fluid temperature warm up time****Description:****Value Units:** transmission fluid temperature normal warm 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 - 10 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

## Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

**Description:** indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

**Value Units:** applied or released

**X Unit:** clutch

**Y Units:** gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

**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	1.600	1.100	0.950	0.850	0.850

**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	2.000	1.100	0.813	0.500	0.269

**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	0.350	0.200

**Initial Supporting table - C2 exhaust delay closed throttle lift foot up shift****Description:** P0777 C2 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 - 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	1.600	1.100	0.950	0.850	0.850

**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	0.213	0.213

**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	3.100	0.900	0.800	0.700	0.263



**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	1.300	1.000	0.950	0.469	0.200

**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	1.600	1.100	0.950	0.850	0.850

**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	0.388	0.144

**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	1.900	0.800	0.750	0.650	0.256

**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	1.400	0.750	0.700	0.663	0.225

**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	1.600	1.100	0.950	0.850	0.850

**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	0.119	0.119

**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	1.900	0.650	0.600	0.550	0.300

**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	1.700	1.369	1.100	0.650	0.338

**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	2	1	1	1	1

**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	0.900	0.613	0.450	0.300	0.163

**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	2.900	1.350	1.100	0.850	0.406

**Initial Supporting table - C6 exhaust delay closed throttle down shift****Description:** P2733 C6 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	1.400	1.100	0.719	0.400	0.350

**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	1.600	1.100	0.950	0.850	0.850

**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	0.850	0.350	0.300	0.238	0.131

**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	1.600	1.100	0.950	0.600	0.600



## Initial Supporting table - Clutch Clip Press CD Shifts

**Description:** Oncoming clutch clip pressure for closed throttle 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	690	800	500	850	703	655

## Initial Supporting table - Clutch Clip Press CU Shifts

**Description:** Oncoming clutch clip pressure for closed throttle lift foot 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	690	800	500	850	703	655

## 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	750	750	750	750	750	750

## 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	690	800	500	850	703	655

## 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	400	800	500	850	703	655

## Initial Supporting table - Clutch Clip Press PU Shifts

**Description:** Oncoming clutch clip pressure for open throttle powered 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	2,100	900	500	850	703	655

**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	1	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	0	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**X Unit:** 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	0	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	0.300	0.300	0.275	0.200	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:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

**Initial Supporting table - Hydraulic Press Avail Tm Thrsh**

**Description:** hydraulic system pressure is available when engine speed is above engine speed threshold for this amount of time

**Value Units:** seconds

**X Unit:** transmission fluid temperature, degrees Celsius

**Y Units:** unitless

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

**Initial Supporting table - Mode Valve A Eng Off Dly Lim****Description:** used for both engine off mode valve A stability delay time required to enable fail time update and fail time threshold**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500



## Initial Supporting table - Mode Valve A Eng Off ML Lim

**Description:** Mode Valve A transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

**Value Units:** Seconds

**X Unit:** Degrees C

**Y Units:** unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

## Initial Supporting table - Mode Valve A Final State

**Description:** ETRS mode valve A position**Value Units:** mode valve position**X Unit:** ETRS diagnostic range**Y Units:** ETRS command direction

## Mode Valve A Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

## Mode Valve A Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

## Mode Valve A Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveLow		
5	CePSCR_e_ModeValveHigh		
6	CePSCR_e_ModeValveLow		
7	CePSCR_e_ModeValveHigh		

**Initial Supporting table - Mode Valve A StdySt Rmdl Lim**

**Description:** Cal limit for Mode Valve B turbine delay. Temp based. Amount the VaPSDR\_t\_MV\_SS\_Dly timer reaches limit before a slip check will be made to determine if the failure is a sensor or a value

**Value Units:** Seconds

**X Unit:** Degrees C

**Y Units:** unitless

y/x	-40	-20	0	20	130
1	0	0	0	0	0

**Initial Supporting table - Mode Valve A steady state turbine speed delay****Description:** ETRS mode valve A steady state turbine speed delay**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

## Initial Supporting table - Mode Valve A Trnstn State

**Description:** Mode Valve A transition state**Value Units:** TePSCR\_e\_ModeValveStat**X Unit:** CeSTGR\_i\_ETRS\_CmndDirctn**Y Units:** CeSTGR\_i\_ETRS\_CmndDirctn

y/x	CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs	CeSTGR_e_ETRS_NeutShf
CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

**Initial Supporting table - Mode Valve B Eng Off Dly Lim****Description:** used for both engine off mode valve B stability delay time required to enable fail time update and fail time threshold**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

## Initial Supporting table - Mode Valve B Eng Off ML Lim

**Description:** Mode Valve B transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

**Value Units:** Seconds

**X Unit:** Degrees C

**Y Units:** unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

## Initial Supporting table - Mode Valve B Final State

**Description:** ETRS mode valve B position**Value Units:** mode valve B position**X Unit:** ETRS diagnostic range

## Mode Valve B Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

## Mode Valve B Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

## Mode Valve B Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveHigh		
5	CePSCR_e_ModeValveLow		
6	CePSCR_e_ModeValveHigh		
7	CePSCR_e_ModeValveHigh		



**Initial Supporting table - Mode Valve B garage shift turbine speed delay limit****Description:** ETRS mode valve A garage shift transtion turbine speed delay**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius

y/x	-40.0	-20.0	0.0	20.0	130.0
1	0.250	0.250	0.250	0.250	0.250

**Initial Supporting table - Mode Valve B StdySt Rmdl Lim**

**Description:** Cal limit for Mode Valve B turbine delay. Temp based. Amount the VaPSDR\_t\_MV\_SS\_Dly timer reaches limit before a slip check will be made to determine if the failure is a sensor or a value

**Value Units:** Seconds

**X Unit:** Degrees C

**Y Units:** unitless

y/x	-40	-20	0	20	130
1	0	0	0	0	0

**Initial Supporting table - Mode Valve B steady state turbine speed delay limit****Description:** ETRS Mode Valve B steady state turbine speed delay limit**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

## Initial Supporting table - Mode Valve B Trnstn State

**Description:** Mode Valve B transition state.

**Value Units:** TePSCR\_e\_ModeValveStat

**X Unit:** CeSTGR\_i\_ETRS\_CmndDirctn

**Y Units:** CeSTGR\_i\_ETRS\_CmndDirctn

y/x	CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs	CeSTGR_e_ETRS_NeutShf
CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

## Initial Supporting table - Mode valve fail delay limit

**Description:** mode valve fail delay limit**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	6.000	2.000	1.500	1.000	1.000

## Initial Supporting table - Mode Vlv A GS TurbDly Lim

**Description:** mode valve A garage shift transtion turbine speed delay**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - Mode Vlv StdySt Park Dly Lim

**Description:** fail delay time**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.000	0.731	0.244	0.244	0.244

## Initial Supporting table - NumClchTieUp

**Description:** NumClchTieUp**Value Units:** minimum # of clutches**X Unit:** command gear or attained gear**Y Units:** not applicable, no units, single row table f(gear)**NumClchTieUp - 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
1	2	3	2	2	2	2	2

**NumClchTieUp - 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
1	2	2	1	1	1	1	1

**NumClchTieUp - Part 3**

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - Part 4**

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

**NumClchTieUp - 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
1	2	2	2	1	1	1	1

**NumClchTieUp - 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_wNC2C3C4C5
1	1	1	1	1	1	1	1

**NumClchTieUp - 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
1	1	1	2	1	1	1	1

**NumClchTieUp - Part 8**

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
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Initial Supporting table - NumClchTieUp							
1	1	1	1	1	1	1	

**Initial Supporting table - P0723 transmission engaged state time threshold****Description:** time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

**Initial Supporting table - P0741 (GF9 specific) TCC slip speed crash RPM****Description:** RPM limit used to establish slip crashed when TCC oil became available**Value Units:** RPM**X Unit:** % accelerator position

y/x	0.00	15.00	25.00	50.00	75.00
1	100	100	160	233	300

**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	1.000	1.000

## 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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

**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	4	4

**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	2.000	2.000

**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	172.0	172.0



**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	172.0	172.0

## 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_C2 C_ClchSpdSnsr 1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

**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 - 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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

**Initial Supporting table - P2818 (GF9 specific) control valve test time**

**Description:** Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

**Value Units:** seconds

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

**Initial Supporting table - P2818 stuck on test time**

**Description:** Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

**Value Units:** seconds

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

## Initial Supporting table - P2818 torque converter derivative slip speed fail threshold

**Description:** The fail threshold, rate of change of torque converter slip speed, at which the torque convert clutch is considered stuck on.

**Value Units:** RPM/second

**X Unit:** transmission fluid temperature °C

y/x	-7.00	10.00	40.00
0	-600.0	-600.0	-600.0
15	-600.0	-600.0	-600.0
25	-900.0	-900.0	-900.0
50	-1,200.0	-1,200.0	-1,200.0
75	-1,500.0	-1,500.0	-1,500.0

## Initial Supporting table - P2D2 Cltch Slip Sum

## Description:

**Value Units:** rate of change of output rpm (dn) per 25 milliseconds**X Unit:** % brake pedal position**Y Units:** not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192



## Initial Supporting table - P2D2 Decel Pressure - C1

**Description:** clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	130.9	130.9	9,999.0	337.3	401.3

## P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	130.9	337.3	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	337.3	50.0	50.0	401.3

## P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	631.9	631.9	50.0	130.9	9,999.0

## P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	337.3	401.3	9,999.0	130.9	337.3

## P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	130.9	9,999.0	50.0	50.0	50.0

## P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	337.3	50.0	50.0	401.3	631.9

## P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C1

1	631.9	50.0	130.9	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
<b>P2D2 Decel Pressure - C1 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	631.9	401.3	337.3	50.0
<b>P2D2 Decel Pressure - C1 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C2

**Description:** clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	352	352	352	9,999	2,125

## P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	786	479	352	511	9,999

## P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	786	479	50	50

## P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,125

## P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	749	749	50	352	352

## P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,125	786	479	352

## P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	511	9,999	50	50	50

## P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,125	749

## P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C2

1	749	50	511	563	563
<b>P2D2 Decel Pressure - C2 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	786	479
<b>P2D2 Decel Pressure - C2 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	352	749	2,125	9,999	50
<b>P2D2 Decel Pressure - C2 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C3

**Description:** clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	243	243	243	1,267	9,999

## P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	693	245	243	245	1,295

## P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	693	354	50	50

## P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,267	50	50	9,999

## P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	661	661	50	243	243

## P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,267	9,999	693	245	243

## P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	245	1,295	50	50	50

## P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,267	50	50	9,999	661

## P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C3

1	661	50	245	270	270
<b>P2D2 Decel Pressure - C3 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	693	354
<b>P2D2 Decel Pressure - C3 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	243	661	9,999	1,267	50
<b>P2D2 Decel Pressure - C3 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C4

**Description:** clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	432	432	476	1,020	1,553

## P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	432	898	432	1,126

## P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,683	9,999	1,739	50	50

## P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,020	50	50	1,553

## P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	432	476

## P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,020	1,553	9,999	432	898

## P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	432	1,126	50	50	50

## P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,020	50	50	1,553	9,999

## P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	432	476	476
<b>P2D2 Decel Pressure - C4 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,126	1,126	1,683	9,999	1,739
<b>P2D2 Decel Pressure - C4 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	898	2,030	1,553	1,020	50
<b>P2D2 Decel Pressure - C4 - Part 12</b>					
y/x					
1					



## Initial Supporting table - P2D2 Decel Pressure - C5

**Description:** clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	138	138	138	251	313

## P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	634	9,999	672	138	251

## P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	313	634	9,999	50	50

## P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	765	50	50	1,164

## P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	138	138

## P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	251	313	634	9,999	672

## P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	138	251	50	50	50

## P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	765	50	50	1,164	9,999

## P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	138	138
<b>P2D2 Decel Pressure - C5 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	251	251	313	634	9,999
<b>P2D2 Decel Pressure - C5 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	672	9,999	1,164	765	50
<b>P2D2 Decel Pressure - C5 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C6

**Description:** clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	176	176	176	278	325

## P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	495	253	9,999	176	278

## P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	325	495	1,016	50	50

## P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

## P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	176	176

## P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	278	325	495	253	9,999

## P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	176	278	50	50	50

## P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

## P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW
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## Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	253	176	176
<b>P2D2 Decel Pressure - C6 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	278	278	325	495	1,016
<b>P2D2 Decel Pressure - C6 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
<b>P2D2 Decel Pressure - C6 - Part 12</b>					
y/x					
1					

## Initial Supporting table - P2D2 Decel Pressure - C7

**Description:** clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

**Value Units:** kPa

**X Unit:** command gear

**Y Units:** not applicable, no units, single row table f(command gear)

## P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

## P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

## P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

## Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
<b>P2D2 Decel Pressure - C7 - Part 10</b>					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 11</b>					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
<b>P2D2 Decel Pressure - C7 - Part 12</b>					
y/x					
1					

## Initial Supporting table - Park Position Sensor A Dly Lim

**Description:** Delay timer limit for Park Sensor A Performance. Temp based**Value Units:** Seconds**X Unit:** Degrees C**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1	1	1	1	1

## Initial Supporting table - Park Postition Sensor B Dly Lim

**Description:** Delay timer limit for Park Sensor B Performance. Temp based**Value Units:** Seconds**X Unit:** Degrees C**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1	0	0	0	0



**Initial Supporting table - Park Valve Eng Off Dly Lim****Description:** P187E time engine must be not running to enable fail time update**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	3.100	2.500	2.100	1.100	0.600

## Initial Supporting table - Park Valve Stk Off Dly Lim

**Description:** P187E Transmission Park Valve Stuck Off fail enable delay time**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	1.600	1.200	1.000	1.000	1.000

## Initial Supporting table - Park Valve Stk Off Fail Lim

**Description:** Fail timer limit for Park Servo to move from OOP to P. Temp based**Value Units:** Seconds**X Unit:** Degrees C**Y Units:** unitless

y/x	-40	-20	0	20	130
1	0	0	0	0	0

## Initial Supporting table - Park Valve Stk On Dly Lim

**Description:** P187D Transmission Park Valve Stuck On fail enable delay time**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	3.500	2.700	0.500	0.250	0.250

## Initial Supporting table - Park Valve Stk On Fail Lim

**Description:** Fail timer limit for Park servo to Move from P to OOP. Temp based**Value Units:** Seconds**X Unit:** Degrees C**Y Units:** unitless

y/x	-40	-20	0	20	130
1	0	0	0	0	0

## Initial Supporting table - PISA Stk Off Eng Off Dly Lim

**Description:** P18A8 fail time, engine not running**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	0.031	0.031	0.031	0.031	0.031

**Initial Supporting table - transmission fluid temperature warm up time****Description:****Value Units:** transmission fluid temperature normal warm 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

# 21OBDG03D CGM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- CGM (Initial DTCs)								
OBD GROUP: 3D			TEST GROUP: MGMXT02.0500			EMMISSIONS STDS: SULEV30		
Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/Start Position Circuit Stuck Low Detected	B2B0D	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to INACTIVE while the serial data signal is set to ACTIVE	Run/Crank Analog Signal State <b>AND</b> Run/Crank Terminal Status <b>AND</b> X <b>OUT OF</b> Y	<= 1.5V  = ACTIVE  = 80  = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips
Ignition Switch Run/Start Position Circuit Stuck High Detected	B2B0E	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to ACTIVE while the serial data signal is set to INACTIVE.	Run/Crank Analog Signal State <b>AND</b> Run/Crank Terminal Status <b>AND</b> X <b>OUT OF</b> Y	>=5.5V  = INACTIVE  = 80  = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips
Bus-Off detected on the HS Primary bus (Bus A)	U2413	This fault is set if the HS Primary bus enters the Bus-Off state	Bus Off Event Occurred on HS Primary	= TRUE	Run/Crank Analog Signal State <b>OR</b> Comm Enable Hardwire Line  <b>AND</b> System Voltage	>= 5.5V  >= 4.5V  > 5.5V	25[usec] for pass 10[usec] for fail	Type B 2 Trips



# 21OBDG03D CGM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- CGM (Initial DTCs)								
OBD GROUP: 3D			TEST GROUP: MGMXT02.0500			EMMISSIONS STDS: SULEV30		
Internal memory failure on the CGM Detected	B2B12	This monitoring checks whether a double bit ECC error has occurred in code flash or RAM. This fault is set if an ECC error has occurred.	ECC Error Detected	= TRUE	Guarded Read Flag	= FALSE	50ms	Type B 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 whether the ALU in the microcontroller is functioning correctly by running an algorithm and checking the results against an expected value. If the result is incorrect the fault shall be set.	Test Result 1 <b>AND</b> Test Result 2	!= Expected Result 1  != Expected Result 2	N/A	N/A	1.5 us	Type B 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		

# 21OBDG03D CGM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- CGM (Initial DTCs)								
OBD GROUP: 3D			TEST GROUP: MGMXT02.0500			EMMISSIONS STDS: SULEV30		
Loss of Communication with the ECM Detected	U18D5	This monitoring shall check a supervised message from the ECM to check the communication status. If the CGM has not received the supervised message from the ECM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 62.5[ms] <b>THEN</b> Secondary Timer (4 sec)	= TRUE  = 0 sec	Run/Crank Analog Signal State <b>AND</b> System Voltage	>= 5.5V  >= 7V	4.0625 [sec]	Type B 2 Trips
Loss of Communication with the TCM Detected	U18D7	This monitoring shall check a supervised message from the TCM to check the communication status. If the CGM has not received the supervised message from the TCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 2.5[sec] <b>THEN</b> Secondary Timer (4 sec)	= TRUE  = 0 sec	Run/Crank Analog Signal State <b>AND</b> System Voltage	= ACTIVE  >= 7V	6.5 [sec]	Type B 2 Trips

# 21OBDG03D CGM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- CGM (Initial DTCs)								
OBD GROUP: 3D			TEST GROUP: MGMXT02.0500			EMMISSIONS STDS: SULEV30		
Loss of Communication with the EBCM Detected	U18DC	This monitoring shall check a supervised message from the EBCM to check the communication status. If the CGM has not received the supervised message from the EBCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 2.5[sec] <b>THEN</b> Secondary Timer (4 sec)	= TRUE  = 0 sec	Run/Crank Analog Signal State <b>AND</b> System Voltage	= ACTIVE  >= 7V	6.5 [sec]	Type B 2 Trips

# 21OBDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED--BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Acceleration Sensor										
Lateral Acceleration Sensor	C0061	All	This monitoring checks if the value sent by the lateral acceleration sensor is plausible or not.	[Measured raw value of lateral acceleration]	> 15 [m/s^2]	Ignition state ON AND Lateral fault at inertial sensors is detected	= True  = False	0.800 [s]	Continuous	Type C, No MIL, Emissions Neutral
		Performance vehicles	This monitoring checks if the value sent by the lateral acceleration sensor is plausible or not.	[Measured raw value of lateral acceleration] AND ESC is off or Competitive mode is activated	> 20 [m/s^2]  = True	Ignition state ON AND Lateral fault at inertial sensors is detected	= True  = False	0.800 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the lateral acceleration offset is correct.	[ Lateral acceleration offset ]	> 2.25 [m/s^2]	Ignition state ON AND Vehicle speed AND Vehicle speed AND Lateral fault at inertial sensors is detected AND Circular driving AND Bank curve is detected AND Vehicle forward driving AND [ Filtered AY sensor signal ]	= True  > 6.71 [mph]  < 124.15 [mph]  = False = False = False = True  <= 2.25 [m/s^2]	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks for a physically plausible lateral acceleration signal.	Case 1 - Standstill monitoring: The absolute, filtered value of the measured, offset corrected lateral acceleration	> 7 [m/s^2]	Case 1: Ignition state ON  AND Vehicle speed AND Wheels are locked AND Lateral fault at inertial sensors is detected AND ESP or ABS intervention AND Filtered Yaw rate acceleration	= True  < 2.17 [mph]  = False = False = False  < 2.5785 [deg/s^2]	0.400 [s]	Continuous	Type C, No MIL, Emissions Neutral
				Case 2 - Monitoring during model observability: Integrated value of lateral acceleration deviation between measured, offset corrected lateral acceleration and reference model acceleration divided by the vehicle speed	> 10 [deg]	Case 2: Ignition state ON  AND Measured yaw rate fits to the yaw rate calculated from steering angle AND Vehicle speed AND YRS Offset compensation calculation finished AND Oversteering driving behavior is detected AND ESP or ABS intervention	= True  = True = True = True = False = False	Depends on the amount of failure.		
				Case 3 - Monitoring during validity: Absolute deviation between measured, offset corrected lateral acceleration and reference model acceleration	> 2.5 [m/s^2]	Case 3: Ignition state ON  AND Bank curve is detected AND Straight ahead driving AND Vehicle moving direction is forward AND Vehicle speed AND ESP or ABS intervention	= True  = False = True = True = True = True = False	1.6 [s]		
Longitudinal Acceleration Sensor Circuit/Open	C0551	All	This monitoring checks if there is a longitudinal acceleration sensor failure due to stuck signal.	Deviation between measured longitudinal acceleration and longitudinal acceleration calculated by differentiating vehicle reference speed  AND For time	> 36 [%]  >= 2 [s]	Ignition state ON  AND ESP or ABS intervention AND Longitudinal fault at inertial sensors is detected AND Vehicle speed AND Wheel speed signals are valid AND Ax Modulation	= True  = False = False >= 13.42 [mph] = True  <= 0.5 [m/s^2]	2 [s]	Continuous	Type C, No MIL, Emissions Neutral

# 210BDG03D EBCM Summary Tables

## DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		All	This monitoring checks if the acceleration measured by the longitudinal acceleration sensor is implausible.	Case 1: Longitudinal acceleration value AND For time	> 4 [m/s^2]  >= 20 [s]	Case 1: Ignition state ON AND Brake is applied AND Brake applied signal is valid AND Vehicle speed AND ESP or ABS intervention AND Longitudinal fault at inertial sensors is detected AND Wheel speed signals are valid	= True  = False  = False  >= 3.35 [mph]  = False  = False  = True	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
			Case 2: Difference between measured and offset corrected longitudinal acceleration and calculated longitudinal acceleration AND For time	> 3.5 [m/s^2]  >= 4 [s]	Case 2: Ignition state ON  AND ESP or ABS intervention AND Vehicle speed AND Wheel speed signals are valid AND Longitudinal fault at inertial sensors is detected AND Vehicle moving direction is forward AND Off-road driving suspected	= True  = False  >= 3.35 [mph]  = True  = False  = True  = False	4 [s]			
		All	This monitoring checks if the raw value sent by the longitudinal acceleration sensor is plausible or not.	[Measured raw value of longitudinal acceleration] AND For time	> 15 [m/s^2]  >= 3 [s]	Ignition state ON AND Longitudinal fault at inertial sensors is detected	= True  = False	3 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the longitudinal acceleration offset is correct.	[Longitudinal acceleration offset] AND Vehicle should be driven (The travelled distance since last AXS offset reset during allowed AXS offset calculation)	>= 2.25 [m/s^2]  > 6.21 [miles]	Ignition state ON AND Longitudinal fault at inertial sensors is detected  AND Vehicle speed AND Vehicle speed AND ESP or ABS intervention AND Vehicle moving direction is forward	= True  = False  >= 6.71 [mph]  < 124.15 [mph]  = False  = True	0.040 [s]	Continuous	Type C, No MIL, Emissions Neutral
CAN Bus A										
Autonomous Braking Accelerator Actual Position Status Message Counter Incorrect	C1288	All	This monitoring checks if there is any error in the received 'Autonomous Braking Accelerator Actual Position Status Protection Value' of message PPEI_Torque_Request_Status_HS signal, or an invalid value is indicated.	Signal error counter value	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Torque Request Status HS' AND Start Stop function is inactive	= True  = True  = received  = True	0.125 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is any error in the received 'Autonomous Braking Accelerator Actual Position Status Rolling Count' of the message PPEI_Torque_Request_Status_HS signal, or an invalid value is indicated.	Signal error counter value	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Torque Request Status HS' AND Start Stop function is inactive	= True  = True  = received  = True	0.125 [s]	Continuous	Type C, No MIL, Emissions Neutral
Engine Control Module Indicated Torque Interface Failed	C2A07	All	This monitoring checks if signal EngTrqRdFirSt of the message PPEI_Engine_Torque_Status_2_HS is received with a specified value which means there is a communication failure.	EngTrqRdFirSt signal is received with value AND Failure counter value	= 4  = 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Engine Torque Status 2 HS'	= True  = True  = received	0.125 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if EngTrqRdFirSt of the message PPEI_Engine_Torque_Status_2_HS is received with proper value.	EngTrqRdFirSt signal is received with value AND Failure counter value	= 5 OR 6 OR 7  >= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Engine Torque Status 2 HS'	= True  = True  = received	0.125 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if EngTrqRdFirSt signal of the messaoe PPEI_Engine_Torque_Status_2_HS	Signal is set to	= 1 OR 2	Ignition state ON AND	= True	0.250 [s]	Continuous	Type C, No MIL, Emissions Neutral

## 21OBDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED--BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			is set to a defined value.			Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Engine Torque Status 2 HS'	= True  = received			
Invalid Data Received From Restraints Control Module	U0452	All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Rolling Count Primary' of the message IMU_Yaw_Latitud_Acc_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'IMU Yaw Latitud Acc CE' AND Start Stop function is inactive	= True  = True  = received  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Checksum Primary' of the message IMU_Yaw_Latitud_Acc_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 10 (+2/step)	Ignition state ON  AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'IMU Yaw Latitud Acc CE' AND Start Stop function is inactive	= True  = True  = received  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Rolling Count Secondary' of the message IMU_Yaw_Long_Acc_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'IMU Yaw Long Acc CE' AND Start Stop function is inactive	= True  = True  = received  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Checksum Secondary' of the message IMU_Yaw_Long_Acc_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 10 (+2/step)	Ignition state ON  AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'IMU Yaw Long Acc CE' AND Start Stop function is inactive	= True  = True  = received  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Longitudinal/Lateral Acceleration Sensor Value Alive Rolling Count' of the message PPEI_Long_Lat_Sensor_Data_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 100 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Long Lat Sensor Data CE'	= True  = True  = True	2.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Longitudinal/Lateral Acceleration Sensor Checksum' of the message PPEI_Long_Lat_Sensor_Data_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 100 (+2/step)	Ignition state ON  AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Long Lat Sensor Data CE'	= True  = True  = True	2.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the received signal IMUDataMsk of message IMU_Yaw_Long_Acc_CE is invalid.	Failure counter value	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
Invalid Data Received From Power Steering Control Module "A"	U0420	All	This monitoring checks if signal group or frame 'Steering Wheel Angle Alive Rolling Count' of the message PPEI_Steering_Wheel_Angle_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Steering Angle Sensor Checksum' of the message PPEI_Steering_Wheel_Angle_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 10 (+2/step)	Ignition state ON  AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the received signal StrWhAngMsk of message PPEI_Steering_Wheel_Angle_CE is invalid.	Failure counter value	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Steering Wheel Angle CE'	= True  = True  = received	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
Lost Communication With Restraints	U0151	All	This monitoring checks if the message IMU_Yaw_Latitud_Acc_CE from SDM_CE is	Message is not received for time	> 0.100 [s]	Ignition state ON AND	= True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral

## 210BDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED--BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Control Module			received within a time range.			Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True			
		All	This monitoring checks if the message IMU_Yaw_Long_Acc_CE from SDM_CE is received within a time range.	Message is not received for time	> 0.100 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Long_Lat_Sensor_Data_CE from SDM_CE is received within a time range.	Message is not received for time	> 5 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True  = True	5 [s]	Continuous	Type C, No MIL, Emissions Neutral
Lost Communication With Power Steering Control Module "A"	U0131	All	This monitoring checks if the message PPEI_Steering_Wheel_Angle_CE is received within a time range.	Message is not received for time	> 0.100 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
Steering Wheel Position Sensor	C0051	All	This monitoring checks if the steering angle signal is constant when it should change.	Variation of steering angle signal during left and right curve since last vehicle standstill	< 5 [deg]	Ignition state ON  AND Vehicle speed AND Backwards driving is detected AND Blocked wheels are detected AND SAS is initialized and calibrated AND Yaw Rate Sensor signal is valid AND Ay sensor signal is valid	= True   => 3.35 [mph]  = False  = False  = True  = True  = True	0.040 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the steering angle velocity is plausible or not.	Steering angle signal gradient OR Steering angle signal gradient after 2 messages OR Steering angle signal gradient after 3 messages	> 30 [deg]/0.020 [s]  > 60 [deg]/0.020 [s]  > 90 [deg]/0.020 [s]	Ignition state ON AND SAS is initialized and calibrated AND Number of SAS network messages received in the previous task cycle AND Bus communication is active	= True  = True  = 2  = True	0.060 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the Steering angle offset has an acceptable value.	Steering angle offset	> 15 [deg]	Ignition state ON AND SAS is initialized and calibrated AND Vehicle speed AND Vehicle speed AND Circular driving AND Vehicle forward driving AND Bank curve is detected AND SAS absolute angle	= True  = True  => 6.71 [mph]  <= 124.15 [mph]  = False  = True  = False  <= 30 [deg]	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks the Steering Angle Sensor's range by checking the raw sensor signal.	Absolute value of received raw sensor signal	> 810 [deg]	Ignition state ON AND SAS is initialized and calibrated AND Bus communication is active	= True  = True  = True	0.3 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the steering angle signal is physically plausible.	Difference between measured steering angle and model calculated value based on yaw rate signal	> 10-100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Ignition state ON  AND Steering Angle Sensor is calibrated AND Vehicle speed AND Lateral acceleration AND Curve driving AND No wheel speed differences detected AND Stable acceleration AND	= True  = True  => 3.36 [mph]  => 0.5 [m/s^2]  => 2 [deg/s]  = True  = True	0.400 [s] - 4.8 [s] depending on the extent of the deviation - the larger the deviation is, the smaller the detection time	Continuous	Type C, No MIL, Emissions Neutral

# 210BDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED—BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Lateral acceleration AND Curve driving	< 0.5 [m/s^2]  < 2 [deg/s]			
		All	This monitoring checks if the sign of the steering angle signal is incorrect.	Calculated integral value during forward driving OR Calculated integral value independently from driving direction	> -30 [deg]  > -90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving with yaw rate	= True  > 43.62 [mph]  ≥ 3 [deg/s]	Immediately	Continuous	Type C, No MIL, Emissions Neutral
Vehicle Hold Enable Status Not Plausible	C15C6	All	This monitoring checks if AVH enabled and AVH active signals are different from those which are transmitted by EBCM.	AVH enabled/AVH active signals received from ECM	<> signals transmitted by EBCM	Communication related conditions are fulfilled	= True	2 [s]	Continuous	Type C, No MIL, Emissions Neutral
Reverse Gear Signal Circuit	C102A	All	This monitoring checks if the reverse gear signal is permanently at high level.	Reverse gear signal AND Vehicle speed AND For time	= engaged  > 24.85 [mph]  > 20 [s]	Ignition state	= On	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
			This monitoring checks if the reverse gear signal is permanently at low level.	Reverse gear signal AND Vehicle is on a slope of AND Brake light switch is set AND For time	= not engaged  < -2 [%]  = True  ≥ 4 [s]	Ignition state	= On	4 [s]	Continuous	Type C, No MIL, Emissions Neutral
CAN Bus E										
Park Assist Control Module	C15A3	All	This monitoring checks for stuck distance information from APA sensor.	Distance travelled with stuck signal while the vehicle is still moving AND Time elapsed with stuck signal while the vehicle is moving	> 0.2 [m]  > 0.6 [s]	Engine running AND Park Assist function is active AND Vehicle speed AND Distance measured by the APA sensor is not changing AND EBCM receives information from WSS that the vehicle is moving	= On  = True  > 0 [mph]  = True  = True	0.600 [s]	Continuous	Type C, No MIL, Emissions Neutral
			This monitoring checks if the vehicle velocity for the parking maneuver is within the safe limits.	Velocity value received from APA ECU	> 6.21 [mph]	Engine running AND Park Assist function is active	= On  = True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the APA Status is in context of the status of the EBCM park assist function	APA status	= Active or Finished or Error	Engine running AND APA is in Control or Active Hold state	= On  = True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the vehicle velocity for the parking maneuver is not too low for any kind of movement.	Velocity value received from APA ECU	= 0 [mph]	Engine running AND Park Assist function is active AND Vehicle speed	= On  = True  = 0 [mph]	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
Lost Communication With Multi-axis Acceleration Sensor Module "A"	U0125	All	This monitoring checks if the message IMU_Yaw_Latitud_Acc_CE from IMU_CE is received within a time range.	Message is not received for time	> 0.100 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message IMU_Yaw_Long_Acc_CE is received within a time range.	Message is not received for time	> 0.100 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True  = True  = True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Long_Lat_Sensor_Data_CE from IMU_CE is received within a time range.	Message is not received for time	> 5 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True  = True	5 [s]	Continuous	Type C, No MIL, Emissions Neutral
Lost Communication With Body Control Module	U0140	All	This monitoring checks if the message Body_Information_2_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.500 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True  = True	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message Body_Information_4_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.250 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True  = True	0.250 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message Body_Information_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.500 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND	= True  = True	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral



# 21OBDG03D EBCM Summary Tables

## DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		All	This monitoring checks if the message Immobilizer_Identifier_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.500 [s]	Start Stop function is inactive Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message Lighting_Customization_Rqst_1_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.250 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	0.250 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Brake_Apply_Status_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.250 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	0.250 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Gateway_LS_General_Info from BCM_HS is received within a time range.	Message is not received for time	> 1 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	1 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Platform_Eng_Cntrl_Requests_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.630 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	0.630 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message PPEI_Platform_General_Status_HS from BCM_HS is received within a time range.	Message is not received for time	> 0.500 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message Tire_Pressure_Sensors_HS from BCM_HS is received within a time range.	Message is not received for time	> 2.5 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	2.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the message Vehicle_Odometer_HS from BCM_HS is received within a time range.	Message is not received for time	> 12.5 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True = True	12.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
Invalid Data Received From Multi-axis Acceleration Sensor Module "A"	U0432	All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Rolling Count Primary' of the message IMU_Yaw_Latitud_Acc_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'IMU Yaw Latitud Acc CE'	= True = True = received	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Checksum Primary of the message IMU_Yaw_Latitud_Acc_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True = True = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Rolling Count Secondary' of the message IMU_Yaw_Long_Acc_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True = True = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Inertial Measurement Unit Checksum Secondary' of the message IMU_Yaw_Long_Acc_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 10 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND Start Stop function is inactive	= True = True = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Longitudinal/Lateral Acceleration Sensor Alive Rolling Count' of the message PPEI_Long_Lat_Sensor_Data_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 100 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Long Lat Sensor Data CE'	= True = True = True	2.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Longitudinal/Lateral Acceleration Sensor Checksum' of the message PPEI_Long_Lat_Sensor_Data_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 100 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'PPEI Long Lat Sensor Data CE'	= True = True = True	2.5 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the received signal IMUDataMsk of message IMU_Yaw_Long_Acc_CE is invalid.	Failure counter value	>= 10 (+2/step)	( New message 'IMU Yaw Latitud Acc CE' OR New message 'IMU Yaw Long Acc CE' AND ( Ignition state ON AND	= received = received = True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral

## 21OBDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500				EMISSIONS STDS: CAL--SULEV30; FED—BIN30			
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Communication related conditions fulfilled (No error passive, no undervoltage) )	= True			
Invalid Data Received From Parking Assist Control Module "A"	U045A	All	This monitoring checks if signal group or frame 'Automatic Park Assist Braking Request Rolling Count' of message APA_Autonomous_Braking_Req_CE message counter is received with the expected value.	Message counter does not periodically change (failure counter value)	>= 3 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'APA Autonomous Braking Req CE'	= True  = True  = received	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if signal group or frame 'Automatic Park Assist Braking Request Checksum' of message APA_Autonomous_Braking_Req_CE checksum is received with the expected value.	Calculated checksum does not match the received checksum (failure counter value)	>= 3 (+2/step)	Ignition state ON  AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message 'APA Autonomous Braking Req CE'	= True  = True  = received	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
Controller										
Antilock Brake System Active Too Long	C15D5	All	This monitoring checks if the ABS is correctly triggered.	ABS intervention for time	>= 60 [s]	Ignition state ON	= True	60 [s]	Continuous	Type C, No MIL, Emissions Neutral
Brake System Reference Speed Not Plausible	C2A1F	All	This monitoring checks if ABS controller detected that there has been no pressure increase for an implausible long time.	Case 1: Implausible ABS control is detected AND On high mue (friction coefficient)	= True  = True	Case 1: Ignition state ON AND ABS intervention	= True  = True	0.800 [s]	Continuous	Type C, No MIL, Emissions Neutral
				Case 2: Implausible ABS control is detected AND On low mue (friction coefficient)	= True  = True	Case 2: Ignition state ON AND ABS intervention	= True  = True	2 [s]		
Control Module Input Power 1 Circuit	U3006	All	This monitoring checks if the supply voltage on the UBB line drops significantly and that UBVR can be used as redundant power supply.	UBB supply voltage AND UBVR supply voltage	< 6.2 [V]  > 9 [V]	Ignition state ON	= True	0.050 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is UBB supply line failure.	UBB supply line	< 1.5 [V]	Ignition state ON	= True	0.100 [s]	Continuous	Type C, No MIL, Emissions Neutral
Control Module Input Power 2 Circuit	U3007	All	This monitoring checks if the supply voltage on the UBVR line drops significantly and that UBB can be used as redundant power supply.	UBVR supply voltage AND UBB supply voltage	< 6.2 [V]  > 9 [V]	Ignition state ON	= True	0.020 [s]	Continuous	Type C, No MIL, Emissions Neutral
Stability System Active Too Long	C006B	All	This monitoring checks if VDC is active for an implausibly long time (during normal and sport mode).	Case 1 - Normal mode: ( Vehicle speed AND Vehicle Dynamics Control activation for ) OR ( Vehicle speed AND Vehicle Dynamics Control activation for )	<= 62.19 [mph]  > 10 [s]  > 62.19 [mph]  > 5 [s]	Case 1: Ignition state ON AND Vehicle speed	= True  > 12.43 [mph]	5-10 [s]	Continuous	Type C, No MIL, Emissions Neutral
				Case 2 - Sport mode: ( Vehicle speed AND Vehicle Dynamics Control activation for ) OR ( Vehicle speed AND Vehicle Dynamics Control activation for )	<= 62.19 [mph]  > 20 [s]  > 62.19 [mph]  > 10 [s]	Case 2: Ignition state ON AND Vehicle speed	= True  > 12.43 [mph]	10-20 [s]		
Electronic Parking Brake										
Service Release Operation	C2A1D	Brembo	This monitoring checks if the EPB system is in maintenance mode.	Maintenance mode flag is set	= True	Ignition state ON AND Brake states have been commanded to release to maintenance position	= True  = True	0.010 [s]	Continuous	Type C, No MIL, Emissions Neutral
		Mando	This monitoring checks if the EPB system is in maintenance mode.	PBC enters into Maintenance mode and Service-Release operation is active	= True	Ignition state ON	= True	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		TRW	This monitoring checks if the EPB system is in maintenance mode.	Maintenance mode flag is set	= True	Brake states have been commanded to release to maintenance position	= True	0.010 [s]	Continuous	Type C, No MIL, Emissions Neutral
Hydraulic Valves										

## 210BDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED--BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Brake Fluid Empty	C0049	All	This monitoring checks if the brake fluid reservoir is empty.	Fluid level sensor value is set to logical '1'	= True	Ignition state ON	= True	10 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the fluid level sensor is shorted to battery.	UADC/UZP voltage ratio	> 86 [%]	Ignition state ON	= True	1 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the fluid level sensor is shorted to ground.	UADC/UZP voltage ratio	< 16 [%]	Ignition state ON	= True	1 [s]	Continuous	Type C, No MIL, Emissions Neutral
Brake Hydraulic Circuit Excessive Compliance - Level 1	C2A17	All	This monitoring checks if there is air in the hydraulic backup circuit components: - wheel circuits - main brake cylinder primary circuit (1) - main brake cylinder secondary circuit (2).	Calculated volume deviation (based on Pressure sensor 2 value and plunger position)	> 5 [cm^3]	Vehicle was driven above  AND For time AND Ignition state OFF (Post run) AND Braking is requested (either by driver or by external) AND Parking brake is being applied AND Parking brake is being released AND Vehicle stationary = 100 [s]	> 8.95 [mph]   > 30 [s]  = True  = False  = False  = False  = 100 [s]	0.020 [s]	Once	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is air in the hydraulic components: - wheel circuits - plunger circuit - internal circuit below CSV	Calculated volume deviation (based on Pressure sensor 2 value and plunger position)	> 3.6 [cm^3]	BBF System state  AND Braking is requested (either by driver or by external) AND Pressure sensor 2 value AND For a number of brake events	= Full OR Degraded pedal feel  = True  >= 7 [bar]  >= 2	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral
Brake Hydraulic Circuit Leak Detected - Level 1	C2A22	All	This monitoring checks if there is a leak and/or air in the backup circuit.	Calculated leakage AND Calculated volume deviation (based on Pressure Sensor 2 value and plunger position) AND For time	< 500 [mm^3/s]  < 5 [cm^3]  > 11.4 [s]	Vehicle was driven above AND For time  AND Ignition state OFF (Post run) AND Braking is requested (either by driver or by external) AND Parking brake is being applied AND Parking brake is being released AND Vehicle stationary = 100 [s]	> 8.95 [mph]   > 30 [s]  = True  = False  = False  = False  = 100 [s]	0.020 [s]	Once	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is a leak in the backup circuit.	Calculated leakage based on pressure sensor 1 value AND For time	> 500 [mm^3/s]  > 11.4 [s]	Vehicle was driven above AND For time AND Ignition state OFF (Post run) AND Braking is requested (either by driver or by external) AND Parking brake is being applied AND Parking brake is being released AND Vehicle stationary = 100 [s]	> 8.95 [mph]   > 30 [s]  = True  = False  = False  = False  = 100 [s]	0.020 [s]	Once	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is a leakage in the plunger or in the wheel circuits.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state  AND Braking is requested (either by driver or by external) AND Pressure sensor 2 value AND For a number of brake events AND Brake duration	= Full OR Degraded pedal feel  = True  >= 7 [bar]  >= 2  > 5 [s]	0.020 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the current pressure sensor value is too low for the current Pedal Travel Sensor value.	Pressure sensor value* OR Pedal Travel Sensor value	< too low  > too high	Ignition state ON AND ESP or ABS intervention	= True  = No intervention	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
Master Cylinder Piston Position Higher Than Expected Steering Angle Sensor	C05D2	All	This monitoring checks if the current pressure sensor value is too low for the current Pedal Travel Sensor value.	Pressure sensor value* OR Pedal Travel Sensor value	< too low  > too high	Ignition state ON AND ESP or ABS intervention	= True  = No intervention	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
Steering Wheel Position Sensor	C0051	All	This monitoring checks if the Steering Angle Sensor has been initialized and calibrated.	The steering angle sensor is not initialized OR The steering angle sensor is not calibrated	= True  = True	Ignition state ON AND Bus communication is active	= True  = True	Immediately	Once	Type C, No MIL, Emissions Neutral

# 210BDG03D EBCM Summary Tables

## DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		All	This monitoring checks if the steering angle signal is constant when it should change.	Variation of steering angle signal during left and right curve since last vehicle standstill	< 5 [deg]	Ignition state ON  AND Vehicle speed AND Backwards driving is detected AND Blocked wheels are detected AND SAS is initialized and calibrated AND Yaw Rate Sensor signal is valid AND Ay sensor signal is valid	= True  > 3.35 [mph]  = False  = False  = True  = True  = True	0.040 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the steering angle velocity is plausible or not.	Steering angle signal gradient OR Steering angle signal gradient after 2 messages OR Steering angle signal gradient after 3 messages	> 30 [deg]/0.020 [s] > 60 [deg]/0.020 [s] > 90 [deg]/0.020 [s]	Ignition state ON AND SAS is initialized and calibrated AND Number of SAS network messages received in the previous task cycle AND Bus communication is active	= True  = True  = 2  = True	0.060 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the Steering angle offset has an acceptable value.	Steering angle offset	> 15 [deg]	Ignition state ON AND SAS is initialized and calibrated AND Vehicle speed AND Vehicle speed AND Circular driving AND Vehicle forward driving AND Bank curve is detected AND SAS absolute angle	= True  = True  >= 6.71 [mph]  <= 124.15 [mph]  = False  = True  = False  <= 30 [deg]	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks the Steering Angle Sensor's range by checking the raw sensor signal.	Absolute value of received raw sensor signal	> 810 [deg]	Ignition state ON AND SAS is initialized and calibrated AND Bus communication is active	= True  = True  = True	0.3 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the steering angle signal is physically plausible.	Difference between measured steering angle and model calculated value based on yaw rate signal	> 10-100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Ignition state ON  AND Steering Angle Sensor is calibrated AND Vehicle speed AND Lateral acceleration AND Curve driving AND No wheel speed differences detected AND Stable acceleration AND Lateral acceleration AND Curve driving	= True  = True  > 3.36 [mph]  >= 0.5 [m/s^2]  >= 2 [deg/s]  = True  = True  < 0.5 [m/s^2]  < 2 [deg/s]	0.400 [s] - 4.8 [s] depending on the extent of the deviation - the larger the deviation is, the smaller the detection time	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the sign of the steering angle signal is incorrect.	Calculated integral value during forward driving OR Calculated integral value independently from driving direction	> -30 [deg] > -90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving with yaw rate	= True  > 43.62 [mph]  >= 3 [deg/s]	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		System Voltage								
System Voltage Low	P0562	All	This monitoring checks if there is a hydraulic failure during system undervoltage and braking.	One or more hydraulic monitorings detect a fault AND Time passed since System voltage dropped below threshold	= True < 0.2 [s]	Ignition state ON AND System voltage AND Braking is requested (either by driver or by external) AND BBF System state is not in Backup state	= True  < 6.2 [V]  = True  = True	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is an existing undervoltage situation while other LIN failure is present.	ECU Supply voltage AND Another LIN failure has been detected	< 7.5 [V] = True	Cranking	= False	Immediately	Continuous	Type C, No MIL, Emissions Neutral

## 210BDG03D EBCM Summary Tables

### DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		Brembo	This monitoring checks if the supply voltage is high enough for the actuation.	Case 1: Power supply voltage AND De-Mature condition not met for  Case 2: Power supply voltage AND De-Mature condition not met for  Case 3: Times actuation stopped due to recurring Mature conditions, leading to final actuation abort  De-Mature condition: - Supply voltage > 8.9 [V] for 100[ms].  The mature method described is applicable in case of: - Static apply, - Static release, - Hot brake re-clamp, - Open brake rear, - Close brake rear, - Brake pad adjustment. For the other control functions the fault is set at the first occurrence of undervoltage.	< 6.71 [V]  ≥ 2.4 [s]  < 8.9 [V]  ≥ 0.5 [s]  = 2	Case 1: Actuation has been requested  Case 2: Actuation has been requested  Case 3: Actuation has been requested	= True  = True  = True	Maximum 2.4 [s]	Continuous	Type C, No MIL, Emissions Neutral
		Mando	This monitoring checks if the supply voltage is high enough for the actuation.	EPB is in actuation AND Motor voltage AND Motor Driver Supply voltage AND Motor current value AND For time	= True  < 7.5 [V]  < 9 [V]  = 6 [A] < motor current < 15 [A]  > 0.500 [s]	ECU is ON, but not in Post run AND Cranking AND Actuator/motor is actuated (Apply or release)	= True  = False  = True	0.500 [s]	Continuous	Type C, No MIL, Emissions Neutral
		TRW	This monitoring checks if the supply voltage is high enough for the actuation.	Power supply voltage	< 9 [V]	Actuation (apply or release) has been requested	= True	2 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the motor supply voltage is sufficient to run the Initial Motor Test.	UBMotor voltage	< 5 [V]	Ignition state ON AND During initialization	= True  = True	Immediately	Once	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if Power Supply via UBVR voltage is too low to perform robust motor test.	Measured UBVR voltage	< 8 [V]	Ignition state ON AND Only UBVR is used as redundant supply AND Normal initial motor test was successful	= True  = True  = False	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is an undervoltage measured at UBB supply line.	Measured UBB voltage	< 9.8 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is an undervoltage measured at UBB supply line.	Measured UBB voltage	< 8 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is an undervoltage measured at UBB supply line.	Measured UBB voltage	< 6.5 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if charge pump tests could not be executed because of undervoltage.	Charge pump tests could not be executed due to undervoltage AND For number of times	= True  ≥ 3	Ignition state ON	= True	57 [s]	Cyclically in every 19 [s]	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is fast hydraulic hard undervoltage.	UB_VR	< 6.2 [V]	Ignition state ON AND Vehicle is in standstill	= True  = False	0.020 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the power supply at valve path is below the hard undervoltage threshold.	UB_VR	< 6.2 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the power supply at valve path is below the undervoltage threshold.	UB_VR	< 9.6 [V]	Ignition state ON	= True	1 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if there is an existing overvoltage situation and this is only a replacement failure instead of other NET failures.	Network voltage AND Another NET failure has been detected	< 7.5 [V]  = True	Ignition state ON	= True	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks the number of ECU resets occurred during initial actuator tests.	Number of consecutive ECU resets before finishing the actuator test at startup	≥ 5	( Initial Motor test is running  OR Initial Plunger check is running ) AND Power ON AND ECU reset has occurred	= True  = True  = True  = True	Immediately	Continuous at startup	Type C, No MIL, Emissions Neutral

## 21OBDG03D EBCM Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)										
OBD GROUP: MGMXOBDG03D			TEST GROUP: MGMXT02.0500					EMISSIONS STDS: CAL--SULEV30; FED--BIN30		
System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Wheel Speed Sensors										
Left Front Wheel Speed Sensor Direction (Incorrect Mounting)	C2A01	All	This monitoring checks if the measured rotation direction of FL wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON  AND Vehicle speed AND At least two WSS direction information is available	= True  > 3.13 [mph]  = True	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
Left Rear Wheel Speed Sensor Direction (Incorrect Mounting)	C2A03	All	This monitoring checks if the measured rotation direction of RL wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON  AND Vehicle speed AND At least two WSS direction information is available	= True  > 3.13 [mph]  = True	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
Right Front Wheel Speed Sensor Direction (Incorrect Mounting)	C2A02	All	This monitoring checks if the measured rotation direction of FR wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON  AND Vehicle speed AND At least two WSS direction information is available	= True  > 3.13 [mph]  = True	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
Right Rear Wheel Speed Sensor Direction (Incorrect Mounting)	C2A04	All	This monitoring checks if the measured rotation direction of RR wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON  AND Vehicle speed AND At least two WSS direction information is available	= True  > 3.13 [mph]  = True	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
Wheel Speed Sensor Signal Cross Coupled	C2A23	All	This monitoring checks if the wheel speed sensors at the Front Axle are mounted incorrectly or if the wheel speed sensors at the Front axle are swapped.	Integrated model yaw rate out of Front Axle Wheel Speed Sensors AND Integrated model yaw rate out of Steering Angle Sensor	< -90 [deg]  > 90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving	= True  > 4.47 [mph]  > 3 [deg/s]	30 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the wheel speed sensors at the Rear Axle are mounted incorrectly or if the wheel speed sensors at the Rear axle are swapped.	Integrated model yaw rate out of Rear Axle Wheel Speed Sensors AND Integrated model yaw rate out of Steering Angle Sensor	< -90 [deg]  > 90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving	= True  > 4.47 [mph]  > 3 [deg/s]	30 [s]	Continuous	Type C, No MIL, Emissions Neutral
Wheel Speed Sensors Direction Correlation	C003F	All	This monitoring checks the rotation direction of wheel speed sensors.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON  AND Vehicle speed AND Number of WSS direction information is available	= True  > 3.13 [mph]  >= 3	20 [s]	Continuous	Type C, No MIL, Emissions Neutral
Yaw Rate Sensor										
Yaw Rate Sensor	C0063	All	This monitoring checks if the sensitivity deviation of the yaw rate is within an acceptable range.	Sensitivity deviation of the yaw rate during driving	> 0.25	Ignition state ON AND ESP or ABS intervention AND Curve driving with yaw rate AND Sensor Offset Compensation is finished AND Vehicle moving direction is forward AND SAS Status is fault free	= True  = False  > 0.1745 [deg/s]  = True  = True  = True	Immediately	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the yaw rate gradient from the sensor is plausible.	Yaw rate signal gradient depending on the driving condition	> 10-23 [deg/s]	Ignition state ON AND Yaw Rate Sensor is initialized AND ESP is in full system mode	= True  = True  = True	0.120 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the range of yaw rate is within limits during driving and during standstill.	Case 1: Absolute value of the yaw rate sensor signal (while driving)	> 94.75 [deg/s]	Case 1: Ignition state ON AND Yrs sensor failure detected AND ESP or ABS intervention AND Stable driving conditions are fulfilled AND ESP_Off button state (PATA) AND	= True  = False  = False  = True  = OFF	0.8 [s]	Continuous	Type C, No MIL, Emissions Neutral

# 21OBDG03D EBCM Summary Tables

## DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		All	This monitoring checks if the Yaw Rate offset is within limits depending on the driving situation.			Vehicle reverse moving direction AND No skidding AND Rear axle speed compared to the reference vehicle speed	= False = True < 1.722 [mph]			
				Case 2: Absolute value of the yaw rate sensor signal (while standstill)	> 30 [deg/s]	Case 2: Ignition state ON AND Yrs sensor failure detected AND Vehicle standstill detected	= True = False = True	5 [s]		
				Case 1: Yaw rate offset	> 0.2622 [rad/s]	Case 1: Ignition state ON AND Yrs sensor failure detected AND Vehicle speed AND Stable driving conditions are fulfilled AND ESP or ABS intervention AND Vehicle forward driving AND Full system mode active AND Sensor Offset Compensation is finished	= True = False >= 3.35 [mph] = True = False = True = True = True = True	Immediately	Continuous	Type C, No MIL, Emissions Neutral
				Case 2: Yaw rate offset at the end of the fast compensation	> 0.1309 [rad/s]	Case 2: Fast compensation prepared AND Vehicle forward driving	= True = True	Immediately		
				Case 3: Yaw rate offset	> 0.1309 [rad/s]	Case 3: ( Standstill offset compensation was completed OR Fast offset compensation was completed ) AND Ignition state ON AND Stable driving conditions are fulfilled (no inclined road) AND ESP or ABS intervention AND Vehicle forward driving AND Full system mode active AND Vehicle speed	= True = True = True = True = False = True = True = True >= 3 [mph]	Immediately		
				Case 4: Filtered yaw rate offset	> 0.09163 [rad/s]	Case 4: Ignition state ON AND Full system mode active AND Wheel speed signals are valid AND Vehicle was in standstill for 1.52 [s] AND Drive off	= True = True = True = True = True = True	Immediately		
						Ignition state ON AND Vehicle moving direction is forward AND Curve driving AND Vehicle speed AND System Post Run AND Maximum currently uncompensated wheel tolerance AND SAS Center is identified	= True = True = True = True = False = True = True	3 [s]	Continuous	Type C, No MIL, Emissions Neutral
		All	This monitoring checks if the yaw rate sensor value is plausible.	Case 1: The fault integral calculated from the difference between the measured offset compensated yaw rate and the reference yaw rate (by adding up the quadratic value of the dynamic threshold value each time when this difference is present)	> 0.0061 [rad^2/s]	Case 1: Ignition state ON  AND Full system mode active AND Vehicle forward driving AND	= True  = True = True	Immediately	Continuous	Type C, No MIL, Emissions Neutral

# 21OBDG03D EBCM Summary Tables

## DIAGNOSTIC SUMMARY TABLES -- EBCM (Initial DTCs)

OBD GROUP: MGMXOBDG03D

TEST GROUP: MGMXT02.0500

EMISSIONS STDS: CAL--SULEV30; FED--BIN30

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						YRS Offset compensation calculation finished AND Vehicle speed AND Vehicle oscillation (instability)	= True ≥ 13.42 [mph] = False			
				Case 2: Difference between measured steering angle and model calculated value based on yaw rate signal	> 10 [deg/s] - 100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold) [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Case 2: Ignition state ON  AND Vehicle speed AND Full system mode active AND Lateral acceleration AND Curve driving detected	= True  > 3.35 [mph] = True > 1.11 [m/s^2] = True	0.4-4.8 [s]		
				Case 3: Difference between measured steering angle and model calculated value based on yaw rate signal	> 10 [deg/s] - 100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold) [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Case 3: Ignition state ON  AND Vehicle speed AND Full system mode active AND No large wheel speed differences detected AND Stable acceleration detected	= True  > 3.35 [mph] = True = True = True	0.4-4.8 [s]		
				Case 4: Difference between measured steering angle and model calculated value based on yaw rate signal	> 10 [deg/s] - 100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold) [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Case 4: Ignition state ON  AND Vehicle speed AND Full system mode active AND Lateral acceleration AND Yaw rate	= True  > 3.35 [mph] = True < 0.5 [m/s^2] < 0.035 [rad/s]	0.4-4.8 [s]		
				Case 5: Measured Yaw Rate deviation	> 0.04363 [rad/s] + situation depending values	Case 5: Ignition state ON AND Stable driving conditions are fulfilled (no inclined road) AND ESP or ABS intervention AND Vehicle forward driving AND Full system mode active AND Vehicle speed	= True  = True = False = True = True ≥ 13.42 [mph]	1.6 [s]		



## 21OBDG03D EPS Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EPS								
OBD GROUP: MGMXOBDG03D		TEST GROUP: MGMXT02.0500				EMMISSIONS STDS: CAL--SULEV30; FED--BIN30		
Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle sensor communication protocols. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	CRC and other communication protocol errors.	Fault Detected	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	1ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering rack slip. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Slip detected	Steering Angle offset >= 14° Steering Angle Gradient < 2000°/s	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	1000ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle for value invalidity. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Invalid steering angle	Steering Angle is invalid for longer than 200ms	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	200ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle to check if it's within range. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle OOR	-467° > x > 467°	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	INSTANT	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle for value invalidity. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Rolling count, period or gradient cyclic check invalid	Fail 5 times [5ms per check]	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	25ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle value for plausibility. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle range plausibility check	0° > x > 2016°	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	50ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle sensor calibration status. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Invalid Calibration Status	Estimated or Unknown Calibration status	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage MANUFACTURER ENBL CNTR DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = 0 = TRUE	INSTANT	Safety Emissions Neutral Diagnostic - Type C

## 21OBDG03D EPS Summary Tables

DIAGNOSTIC SUMMARY TABLES -- EPS								
OBD GROUP: MGMXOBDG03D		TEST GROUP: MGMXT02.0500				EMMISSIONS STDS: CAL--SULEV30; FED--BIN30		
Torque Sensor	C1119	Monitors torque sensor communication. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Interference/corruption of transmitted data	Fault Detected	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE \$1F1 (SYSTEM POWER MODE)	= TRUE = 6V < voltage < 18 V = FALSE = 1 /2/4	8ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASIC over/under voltage. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC over/under voltage.	< 6 V >6.32 V	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	3ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASIC short circuit. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC short circuit	Current > 90 mA	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	8ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASIC over temperature. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC over temperature	> 175 °C	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	8ms	Safety Emissions Neutral Diagnostic - Type C