Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/Start Position Circuit 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 **AND** Run/Crank Terminal Status **AND** X **OUT OF** 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	B2BOE	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 **AND** Run/CrankTerminal Status **AND** X **OUT OF** 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 **OR** Comm Enable Hardwire Line **AND** System Voltage	>= 5.5V >= 4.5V > 5.5V	25[usec] for pass 10[usec] for fail	Type B 2 Trips

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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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] **THEN** Secondary Timer (4 sec)	= TRUE - *0 sec*	Run/Crank Analog Signal State **AND** 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] **THEN** Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State **AND** System Voltage	= ACTIVE >= 7V	6.5 [sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	This monitoring checks if the UTLC Sensor 5V supply is lower than expected	Quality sensor power supply voltage	< 4.75V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	This monitoring checks if the UTLC Sensor 5V supply is higher than expected	Quality sensor power supply voltage	> 5.25V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	The diagnostic monitor detects an alive rolling count error or checksum error in any of the Sensor Bus 1 CAN frames $1E2,$2C6, $2F7,and $4CA sent by ECM that are received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports pass. If any value is not in the order listed for any of the frames, then the diagnostic reports fail. OR		[Sensor Bus Wake Up No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Diagnostics check every received message (0.025s or 0.1s or 0.5s)	Type A, ITrip
			if any of the frames checksum	* computed checksum				
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	This monitoring checks if the reductant pressure sensor 5V supply is lower than expected	Pressure sensor power supply voltage	< 4.75V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	This monitoring checks if the reductant pressure sensor 5V supply is higher than expected	Pressure sensor power supply voltage	> 5.25V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit Shorted	P10D9	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	> 0.45 V >95 A >4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE >0% >0% >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B& P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, ITrip
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	This monitoring checks if the Run/Crank wired input on the DEF controller is high, when it is expected to be low	Run/Crank wired input state AND Run/Crank received over CAN	= HIGH = LOW	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	3 s Failure out of 300 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	This monitoring checks if the Run/Crank wired input on the DEF controller is low, when it is expected to be high	Run/Crank wired input state AND Run/Crank received over CAN	= LOW = HIGH	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	3 s Failure out of 300 samples Time basis - 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Heater Supply Circuit Low	P10DC	This monitoring checks if the reductant tank heater supply voltage is lower than reductant controller permanent power supply voltage	ECU power supply voltage - Tank heater power supply voltage	> 3.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Propulstion System Active Time after controller initialization Engine cranking (receieved over CAN) Pump State No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the **"Pumn States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = ACTIVE > 0.51s = FALSE * After-run P20FF & P10F4	0.5s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips
Reductant Control Module Heater Supply Circuit High	P10DD	This monitoring checks if the reductant tank heater supply voltage is greater than reductant controller permanent power supply voltage	Tank heater power supply voltage - ECU power supply voltage	> 3.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Propulstion System Active Time after controller initialization Engine cranking (receieved over CAN) Pump State No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the **"Pumn States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = ACTIVE > 0.51s = FALSE * After-run P20FF&P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit Shorted	P1OF3	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	 > 0.45 V >95 A >4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE >0% >0% >0% P20FF, P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, ITrip
Reductant Control Module Not Programmed	P10F4	This monitoring checks if the ECU is a service part that has not been programmed with application specific software and calibration.	**Software Operational Reference Calibration** AND MEC Note: **Software operational reference calibration** is set to true if application specific calibration has been flashed.	= FALSE = 0	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	No debounce applied Once at ECU initialization	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 3 Low Voltage	P131B	This monitoring checks if the reductant temperature sensor 5V supply is lower than expected	Reducant temperature sensor power supply voltage	< 4.8V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF&P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor Reference Voltage 3 High Voltage	P131C	This monitoring checks if the reductant temperature sensor 5V supply is higher than expected	Reducant temperature sensor power supply voltage	> 5.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCUinternal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
Reductant Heater 3 Control Circuit Shorted	P143C	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	 > 0.45 V >95 A >4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCUinternal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE >0% >0% >0% P20FF & P10F4 P205B &P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 P10DC & P10DD P10C6& U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Resistance Performance	P149F	This monitor checks if the reductant pump resistance is too low during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current OR	< 0.23Q	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	8s Failure out of 800 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip
					Pump state	= Heating		
					Measured pump driver current	>0A		
					<u>Note:</u> Pump heating is disabled in response to the following faults:			
		This monitor checks if the reductant pump resistance is too high during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current	>0.80	Pressure Sensor fault	P204B & P204C & P204D & P204E		
					Reductant Pump fault	P249C & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A		
					Pressure sensor power supply fault	P10CA & P10C9		
					CAN communication fault	P10C6& U2626 & U2412		
					Hardwired Run/Crank	P10DA& P10DB		
					No DCU internal fault	P20FF & P10F4		
					<u>Note 1:</u> To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.			
Reductant Level Sensor Circuit Range/Performance	P2O3B	This monitor checks if reductant level measurements are not available when they are expected to be available. The ultrasonic level sensor transmits a readiness bit with each level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Level Readiness Bit	= FALSE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	200s Failure out of 2000 samples Success out of 6 samples Time basis = 0.1s	Type B, 2 Trips
					Time since last **Refill / Draining**	> 300s		
					Estimated DEF Level	>5L		
					Reductant tank temperature	> 0°C & < 70°C		
					Reductant UTLC temperature	> 3°C & < 70°C		
					Heater 1 PWM Command	= 0%		
					Heater 3 PWM Command	= 0%		
					Slosh Detection Flag	= FALSE		
					Tank Agitation Flag	= TRUE		
					Vehicle speed	> 2km/h		
					No Level Sensor voltage fault	P203C & P203D		
					No SENT communication fault	U2627 & U2628 & U2630		
					No DCU internal fault	P20FF & P10F4		
					<u>Note:</u> See **"Level & Quality Performance"** sheet for oarameter definitions			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Circuit Low Voltage	P203C	This monitor checks if the reductant level sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either piezo excitation voltage faults or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: 1. All signals are transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	> 5.5V < 4.5V > 2.0V < 0.125V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Level Sensor Circuit High Voltage	P203D	This monitor checks if the reductant level sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating that the reductant level measurement is greater than the maximum measureable range is transmitted to the DEFC on the SENT bus.	Reductant Level measurement AND Reductant Level readiness bit Note: Reductant Level readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 400 mm = TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	6s Failure out of 12 samples Sucess out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Pressure Sensor Performance	P204B	This monitor checks if the reductant pressure sensor measure is lower than ambient pressure before the system is pressurized.	Reductant pressure OR Time when pumping internal debounce counter has not reached pass/fail decision maturation	<-36.4 kPa > ls	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state No Pressure Sensor fault No DCU internal fault Note: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = Startup P204C & P204D P20FF & P10F4	Up to 33 s (3xls timeout + 2x15s wait) Malfunction criteria confirmation out of 88 samples Time basis = 0.01s Failure confirmation after **two retries** Recovery only at next driving cycle Note: See **"Repeat Defrost"** sheet for retries definition	Type A, 1 Trip
		This monitor checks if the reductant pressure sensor measure is greater than ambient pressure before the system is pressurized.	Reductant pressure OR Time when puming internal debounce counter has not reached pass/fail decision maturation	> 36.4 kPa > ls				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Sensor Circuit Low Voltage	P204C	This monitor checks if the reductant pressure sensor is shorted to ground or open circuit by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too low. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to -50kPa for 0.35V < Voltages < 0.5V. Additionally, pressure variable is set to OkPA for Voltages < 0.35V.	< 0.45V (-50 kPa)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 10ms	Type A, ITrip
Reductant Pressure Sensor Circuit High Voltage	P204D	This monitor checks if the reductant pressure sensor is shorted to power by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too high. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to 900kPa for 4.5V < Voltages < 4.75V. Additionally, pressure variable is set to OkPA for Voltages > 4.75V.	> 4.90V (0 kPa)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 10ms	Type A, ITrip
Reductant Pressure Sensor Circuit Intermittent/Erratic	P204E	This monitor checks if the reductant pressure signal is erratic. A fail is detected when the change in pressure between two samples is greater than expected.	ABSfPressure sensor signal(t) - pressure sensor signal (t - sample time)] / sample time	> 10 OOOkPa/s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Time after controller initialization No Pressure Sensor fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE > 0.510s P204C & P204D P20FF & P10F4	0.05 s Failure out of 5 samples Time basis = 10ms	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Performance	P2O5B	This monitor checks if, at key on, the reductant temperature sensor is coherent with average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensors used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The average temperature is calculated at the system start up after a calibratable engine stop when all the temperature sensors are expected to be stabilized.	Latched average system startup reference temperature - reductant tank temperature sensor OR Reductant tank temperature sensor - latched average system startup reference temperature	> 30°C > 30°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] **[Average engine startup reference temperature mask** AND **[Average engine startup reference temperature]** AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor fault No CAN communication fault No ECU power supply faults No DCU internal fault Notel: **Average engine start-up reference temperature mask** is set to true if : Engine off time AND At least 4 sensors used in average engine startup reference temperature are: Note2: The malfunction criteria is compared 60s after the first reception of **Average engine start-up reference temperature mask** if the faults listed in enable conditions are not active.	= ACTIVE = ACTIVE = ACTIVE = "Use Data" >-10°C > Is < 3.5 s P205C & P205D & P205E P10C6 & U2626 & U2412 P21CB P20FF and P10F4 > 8hrs = Valid	0.3 s Failure out of 3 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	This monitor checks if the reductant temperature sensor signal is shorted to ground or open circuit by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too low. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A lower voltage is equivalent to a higher temperature.	Reductant temperature sensor signal voltage	<0.3 V (75°C)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	This monitor checks if the reductant temperature sensor signal is shorted to power by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too high. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A higher voltage is equivalent to a lower temperature.	Reductant temperature sensor signal voltage	> 4.75V (-40°C)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip
Reductant Tank Temperature Sensor Circuit Erratic	P2O5E	This monitor checks if the reductant temperature signal is erratic. A fail is detected when the change in temperature between two samples is greater than expected.	ABS[Tank temperature sensor signal(t) - tank temperature sensor signal (t - sample time)] / sample time	> 100°C/s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No Temperature Sensor fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P205C & P205D P20FF & P10F4	0.5 s Failure out of 5 samples Time basis = 0.1s	Type A, ITrip
Reductant Quality Sensor Circuit Range/Performance	P206B	This monitor checks if reductant quality measurements are not available when they are expected to be available. The ultrasonic quality sensor transmits a readiness bit with each quality measurement to identify when the sensor has low confidence in the quality measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Quality Readiness Bit	= FALSE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Time since last **Refill / Draining** Estimated DEF Level Reductant tank temperature Reductant UTLC temperature Heater 1 PWM Command Heater 3 PWM Command **Slosh Detection Flag** **Tank Agitation Flag** Vehicle speed No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See **"Level & Quality Performance"** sheet for parameter definitions	= ACTIVE = ACTIVE = ACTIVE > 300s >5L > 0°C & < 70°C > 3°C & < 70°C = 0% = 0% = FALSE = TRUE > 2km/h P206C & P206D U2627 & U2628 & U2630 P20FF and P10F4	60s Failure out of 600 samples Success out of 40 samples Time basis = 0.1s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Quality Sensor Circuit Low	P206C	This monitor checks if the reductant quality sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either quality measurement is lower than the minimum measureable range, piezo excitation voltage faults are detected, or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[(UTLC quality measurement AND Quality readiness bit) OR PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: All related signals are directly transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	< 0% = TRUE > 5.5V < 4.5V >2V < 0.125V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
Reductant Quality Sensor Circuit High Voltage	P206D	This monitor checks if the reductant quality sensor signal is out of range high. The DEFC receives the quality measurement and corresponding quality readiness bit from the smart UTLC sensor, and performs this check in the DEFC.	Reductant quality measurement AND Reductant Quality readiness bit Note: Reductant Quality readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 63.25% = TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
Reductant Pump Control Circuit	P208A	This monitor checks if any of the 3 phase pump motor control circuits are open.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is Open On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Performance	P208B	This monitor checks if the commanded, arbitrated reducant pump speed and the sensed reductant pump speed are coherent.	ABS(Sensed pump speed - pump speed command)	> 712 rpm	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump State Pump Activation Request Propulsion System Active No DCU internal fault <u>Note1:</u> The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank <u>Note 1:</u> To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = Wait Authorization, OR = Priming, OR = Buildup, OR = Closed Loop Control, OR = Purge, OR = Reductant Delivery Performance, OR = AutoStop =TRUE =TRUE P20FF & P10F4 P204B & P204C & P204D & P204E P249C & P149F & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	37.5 s (3x2.5s fail to stabilize timeout + 2x15s wait time) Malfunction criteria confirmation out of 250 samples Time basis = 10ms Failure confirmation after **two retries.** Before retries, pump is stopped for 15s. When pressure hold is achieved, retries are no longer permitted and an effective retry is counted after 3s with the malfunction criteria met. Success is reported after maximum time that would be required to mature a fault has elapsed. Recovery is possible only on the next driving cycle <u>Note 2:</u> See **"Repeat Defrost"** sheet for retries definition	Type A, ITrip
Reductant Pump Control Circuit Low Voltage	P208C	This monitor checks if any of the 3 phase pump motor control circuits is shorted to ground.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is low voltage due to short to ground On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. <u>Note:</u> fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Control Circuit High Voltage	P208D	This monitor checks if any of the 3 phase pump motor control circuits is shorted to power.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is high voltage to due to short to power On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, I Trip
Reductant Heater 1 Control Circuit	P20B9	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, I Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Performance	P20BA	This monitoring checks if the reductant heater 1 (tank heater 1) resistance or power is outside operating limits.	(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	< 1.00	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant heater 1 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B& P131C P214F & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	> 1.80				
			Reductant heater 1 power command - Reductant heater 1 power OR	> 45W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 1 power - Reductant heater 1 power command	> 45W				
Reductant Heater 1 Control Circuit Low Voltage	P2OBB	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side and or side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off:	 > 0.45V > 95A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
			[ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	< 0.601V > 0.506V = OV				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit High Voltage	P20BC	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Control Circuit	P20BD	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Performance	P20BE	This monitoring checks if the reductant heater 2 (line heater) resistance or power is outside operating limits.	(Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR (Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR Reductant heater 2 power command - Reductant heater 2 power OR Reductant heater 2 power - Reductant heater 2 power command	< 2.20 > 6.5Q > 21W > 21W	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant heater 2 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B& P131C P214F & P20BA & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Control Circuit Low Voltage	P2OBF	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 0.601V > 0.506V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit High Voltage	P20C0	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 3 Control Circuit/Open	P20C1	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 3 Control Circuit Performance	P20C2	This monitoring checks if the reductant heater 3 (tank heater 2) resistance or power is outside operating limits.	(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	< 1.50	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant heater 3 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
			(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	>2.60				
			Reductant heater 3 power command - Reductant heater 3 power OR	> 29W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 3 power - Reductant heater 3 power command	> 29W				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 3 Control Circuit Low	P20C3	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 0.601V > 0.506V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 3 Control Circuit High	P20C4	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Low Pressure	P2OE8	This monitoring checks if reductant pressure is lower than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure setpoint - reductant pressure control signal	> 63 kPa	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state DEF Level Estimation No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance > 3 L P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6& U2626 & U2412 P10DA & P10DB	30 s Failure out of 3000 samples Success out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant High Pressure	P20E9	This monitoring checks if reductant pressure is greater than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure control signal - reductant pressure setpoint	> 63 kPa	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state Engine Auto Stop Active No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance = False P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6& U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Performance	P2OFF	This monitoring checks if the Reducant Control Module has detected a RAM fault.	After writting a checker-board type pattern of 0's and l's into the cells of a bit-oriented memory, difference is found between any cells' expected contents <u>Note:</u> this test is executed with RamTst Vector module, using checkerboard algorithm		[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	No debounce applied Once at initialization	Type A, ITrip
		This monitoring checks if the Reductant Control Module has detected a dataset version that does not fit the SW version.	Computed checksum OR Software operational reference calibration is incompatible to the application software	* stored frame checksum				
		This monitoring checks if the Reductant Control Module has witnessed persistent data error in Non-Volatile Memory	Aborted write operation is detected on applied NVM blocks OR Calculated checksums of related NVM blocks <u>Note:</u> Apply on Application data & IUMPR data NVM blocks	* stored checksums				
		This monitoring checks if the Reductant Control Module has detected inconstitancy in data stored in Non-Volatile Memory	Aborted write operation is detected on applied blocks OR Computed data checksum of related NVM blocks OR Heater calibration are not learned during EOL <u>Note:</u> Apply on Heater calibration NVM blocks	* stored data checksum				
Reductant Pump High Current	P214E	This monitoring checks if the reductant pump motor output driver current exceeds the maximum operating limit current. Calibrateable over-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	Reducant pump hardware protection OR <u>[If Pump Mode = Heating:</u> Reducant pump motor current <u>Else:</u> Reducant pump motor current]	= ACTIVE > 15A >7A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCUinternal fault	= ACTIVE = ACTIVE = ACTIVE P20FF&P10F4	4 s Failure out of 1 sample in case of pump hardware protection is detected. Else, failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 High Current	P214F	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current exceeds the maximum operating limit current.	Reductant heater 1 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Level Sensor 1 Stuck	P21C5	This monitor checks if reductant level measurements are available but stuck. The ultrasonic level sensor transmits a readiness bit with each level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. If this readiness bit indicates that the level measurements are available, but the level measurements do not change sufficiently when tank fluid slosh is expected, this monitor will fail.	Reductant level sensor signal(t) - Reductant level sensor signal (t - 1000ms)	< 0.3mm	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Vehicle speed *(see note1)* Vehicle speed validity Vehicle long, acceleration (see *note4*) Urea state Filtered readiness flag *(see note2)* Estimated DEF Level No Level Sensor faults No Tank Temperature Sensor A faults No CAN communication faults No ECU power supply faults No SENT communication faults No DCU internal faults Note1: Vehicle speed shall be FALSE for 2 consecutive samples to disable this condition. Note2: Sensed level readiness bit shall be TRUE for 6 consecutive samples (600ms) to set the filtered readiness flag to TRUE. Sensed level readiness bit shall be FALSE for 1 sample (100ms) to set the filtered readiness flag to FALSE.	= ACTIVE = ACTIVE = ACTIVE > 25km/h = TRUE > 0.1 m/s^2 = Liquid = TRUE > 5 L P203B & P203C & P203D & P131B & P131C P205B & P205C & P205D & P205E P10C6 & U2626 & U2412 P21CB U2627 & U2628 & U2630 P20FF and P10F4	200s to Fail or 10s to Pass (Step-up/down: 1/20 Fail/pass count : 2000 / -2000 Time basis = 0.1s Note3: See "Level & Quality Performance" sheet for parameters definition Note4: Long. acc. is computed internally in Reductant Control Module from vehicle speed derivation.	Type B, 2 Trips
Reductant Control Module Supply Voltage Low Voltage	P21CB	This monitoring checks if measured reductant permanent power supply voltage is low compared to the vehicle system voltage (received by serial data from ECM)	ECM (Serial Data) Voltage - Reductant Permanent Power Supply Voltage	> 3 V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Engine Cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE - False = True P20FF & P10F4	3 s Failure out of 300 samples Time basis - 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Low Current	P21DD	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 1 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant tank heater 1 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B& P131C P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P2OC3& P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Low Current	P221C	This monitoring checks if the reductant heater 2 (line heater) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 2 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant line heater PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 High Current	P221D	This monitoring checks if the reductant heater 2 (line heater) output driver current exceeds the maximum operating limit current.	Reductant heater 2 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 3 Current Too Low	P221E	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current is below the minimum operating limit current while the heater is commanded on.	Reductant heater 3 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant tank heater 2 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 3 Current Too High	P221F	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current exceeds the maximum operating limit current.	Reductant heater 3 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	This monitoring checks if the reductant pressure does not stabilize to the desired setpoint within the expected time. If the control system determines that the DEF tank may be frozen, the pressure build-up command will be delayed until this defrost routine is complete. The defrost time is defined as a function of measured reductant tank temperature at key on. After this defrost time (or immediately, if no defrost routine was necessary) the control system will attempt a calibrateable number of pressure build-up attempts before this diagnostic reports a failure.	**Pressure Closed Loop Control** AND [Total time from the start of line filling OR Total time from the exit of Start & Stop] Note: See **"Repeat Defrost"** section for Pressure hold definition	* ACTIVE > 15s > 7.5s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state **Estimated DEF Level** No DCU internal fault Note1: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank Note2: When **estimated DEF level** is below the diagnostic enable (reporting threshold) noted above and the failure is confirmed after 1 retry, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement. Note3: To obtain clear understanding of various pump states & transitions, refer to the	= ACTIVE = ACTIVE = ACTIVE = WaitAuthorization, OR = Priming, OR = Buildup, OR = Closed Loop Control >3L P20FF & P10F4 P204B & P204C & P204D & P204E P149F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	75 s (3x15s timeout + 2x15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 0.01s Failure confirmation after **two retries.** Between two retries, pump is stopped for 15s. Success is reported as soon as 'Pressure Closed Loop Control' is active. Recovery only at next driving cycle Note: See **"Repeat Defrost"** sheet for retries definition	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	This monitor checks if, at key on, the reductant UTLC temperature sensor is coherent with the reductant temperature sensor. This monitor runs only at system start up after a calibratable engine stop is elapsed. At this time, all the temperature sensors are expected to be stabilized.	Reductant secondary device temperature information - reductant tank temperature sensor OR Reductant tank temperature sensor - reductant secondary device temperature information	> 21°C >21°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] **[(Average engine startup reference temperature mask** OR Service Tamper Bay test request) AND Reductant Tank Temperature Sensor A AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor A fault No Tank Temperature Sensor B fault No SENT communication fault No DCU internal fault Notel: **Average engine start-up reference temperature mask** is set to "Use Data" if : Engine Off Time Powertrain High Resolution AND At least 4 sensors used in average engine startup reference temperature are) Note2:The malfunction criteria is compared 60s after the first reception of Average engine start-up reference temperature mask if the faults listed in enable conditions are not active.	= ACTIVE = ACTIVE = ACTIVE = "Use Data" > -29°C > Is < 3.5 s P205B & P205C & P205D & P2O5E P2ADD & P2ADB & P2ADC U2627 & U2628 & U2630 P20FF and P10F4 > 8hrs = Valid	3 s Failure out of 6 samples Time basis = 0.5s Recovery only at next driving cycle	Type A, ITrip
Reductant Tank Temperature Sensor B Circuit Low	P2ADB	This monitor checks if the reductant UTLC temperature sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	< -50°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF&P10F4	2s Failure out of 4 samples Time basis = 0.5ms	Type A, ITrip
Reductant Tank Temperature Sensor B Circuit High	P2ADC	This monitor checks if the reductant UTLC temperature sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	>90°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	This monitor checks if the UTLC temperature signal is erratic. A fail is detected when the change in temperature between two samples is greater than the error threshold.	ABS[secondary device temperature sensor signal(t) - secondary device temperature sensor signal (t - 1.3s)]	>8°C/1.3s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	3.9 s Failure out of 3 samples Time basis = 1.3s	Type A, ITrip
Reductant Pump Low Current	P2C11	This monitoring checks if the reductant pump motor output driver current is below the minimum operating limit current. Calibrateable under-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	If Pump Mode = Heating: Reducant pump motor current Else if (Pump State = Priming OR Run): Reducant pump motor current	 < 0.75A < 0.5A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump State Reductant Pressure Sensor Measurement Pump hardware protection Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank No DCU internal fault Note2: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= ACTIVE = ACTIVE = ACTIVE = Pump Heating, OR = Priming, OR = Buildup, OR = Closed Loop Control > 250 kPa = NOT ACTIVE P204B & P204C & P204D & P204E P208B & P20E8 & P20E9 & P149F & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6& U2626 & U2412 P10DA& P10DB P20FF & P10F4	4s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Temperature Response Matured Diagnostic	P2D45	This monitoring checks if measured average reductant temperature is deviating from the Reductant Control Module computed estimation of limit part temprature. Reductant Control Module estimates limit acceptable part (WPA) & non-functional heater (BPU) temperatures based on heaters power & external conditions (ambient temperature, tank temperature, and other noise factors such as slosh & wind) in case of tank heaters activation request.	Average temperature - WPA temperature Note: See "Reductant Temperature Too Low" sheet for parameters description and values	< 0.1°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Temperature sensor initilization (waiting timer) Temperature sensor validity Secondary temperature sensor validity Ambiant air temperature validity Ambient temperature variation range during trip Vehicule engine off time Refill/Draining Monitoring status set this driving cycle Initial absolute difference between ambient temperature and average temperature Initial absolute difference between average temperature and average loss temperature Initial Average temperature Estimated DEF Level [Tank heater 1 PWM command OR Tank heater 2 PWM command] WPA temperature - BPU temperature 'No DCU internal fault Note: Tank heaters power command are force to zero if: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault	= ACTIVE = ACTIVE = ACTIVE > 30s = TRUE = TRUE = TRUE < 20°C > 28,800s = FALSE <30°C <5°C <-14°C >5 L > 10W > 10W > 2°C P20FF & P10F4 & P10DA & P10DB P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 & P21DD P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412	Time basis = 600s One decision per driving cycle Recovery only at next driving cycle	Type B, 2 Trips
Reductant Control Module Powertrain Sensor Bus Off	U2412	The diagnostic monitor detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Sensor bus CAN transmitter transmission errors count Note: The BusOff state is defined by the CAN controller hardware per ISO 11898	>255	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.09s Failure out of 9 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	U2626	This monitoring shall check supervised messages from the ECM for communication status. If the DEFC has not received the message for 5 seconds, then this fault shall be set.	Time whenever any CAN1 ($1E2) message has not been received by DEFC OR	> 0.035s	Sensor Bus Wake Up No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples Diagnostic checks every received message (0.025s, 0.1s or 0.5s). Depends on CAN message transmit time.	Type A, 1Trip
			Time whenever any CAN2 ($2C6) message has not been received by DEFC OR	> 0.11s				
			Time whenever any CAN3 ($2F7) message has not been received by DEFC OR	> 0.11s				
			Time whenever any CAN4 ($4CA) message has not been received by DEFC	> 0.51s				
Reductant Control Module Lost Communication with Reductant Level Sensor	U2627	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE"J2716 - SENT:Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 < 0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1 Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	* {0;l;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis = 0.03s	
Reductant Control Module Lost Communication with Reductant Concentration Sensor	U2628	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE"J2716 - SENT:Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 <0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	* {0;l;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis = 0.03s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 2	U2630	This monitoring checks if Reductant Control Module is able to detect LITLC Sensor Lost Communication diagnostic failure modes described in SAE"J2716 - SENT:Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 < 0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1 Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	≠ {0;l;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis - 0.03s	

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 Booster Internal Power Driver										
Brake Booster Internal Power Driver Range/Performance	C0595	All	This monitoring checks if the B6 Bridge Driver ASIC does not answer properly to the uC test during initialization.	B6 Bridge Driver ASIC is not fault free during the initial test	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks the B6 Bridge Driver ASIC during operational mode and short circuit bits of B6 bridge MOSFETS.	B6 Bridge Driver ASIC is not fault free during the operational mode OR ASIC is not in valid operation mode OR MOSFET Short circuit failure bit is set	= True = True = True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the voltage drops at actuated MOSFET is too high.	Voltage drops at actuated MOSFET	>-210 [mV]	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit Range/Performance	C0582	All	This monitoring checks if the measured voltage on an idle MOSFET is not in mid-level.	The measured voltage on an idle MOSFET is not in mid-level	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if MOSFETs of Bridge Driver can be controlled and actuated properly.	BMS_MON to UBB Ratio is at low level in case of BMS switched ON OR BMS_MON to UB6 Ratio is at low level in case of BMS_RVP is switched ON OR BMS_MON is at high level in case of BMS is switched OFF OR BMS_MON is at high level in case of BMS_RVP is switched OFF	= True = True = True = True	Ignition state ON	= True	5[s]	Once	Type A, 1 Trip
Brake Booster Temperature Sensor A										
Brake Booster Temperature Sensor "A" Circuit High	P25C7	All	This monitoring checks if the BLM Temperature Signal 1 is shorted to Supply.	BLM Temperature Signal 1 AND Number of times when line high voltage is consecutively detected	> 3.27 [V] >= 5	Ignition state ON	= True	0.600 [s]	Continuous	Type B, 2 Trips
Brake Booster Temperature Sensor "A" Circuit Low	P25C6	All	This monitoring checks if the BLM Temperature Signal 1 is shorted to Ground.	BLM Temperature Signal 1 AND Number of times when line low voltage is consecutively detected	< 0.2 [V] >=5	Ignition state ON	= True	0.600 [s]	Continuous	Type B, 2 Trips
Brake Booster Temperature Sensor B										
Brake Booster Temperature Sensor "B" Circuit High	C057A	All	This monitoring checks if the BLM Temperature Signal 2 is shorted to Supply.	BLM Temperature Signal 2 AND Number of times when line high voltage is consecutively detected	> 3.14 [V] >= 5	Ignition state ON	= True	0.600 [s]	Continuous	Type B, 2 Trips
Brake Booster Temperature Sensor "B" Circuit Low	C0579	All	This monitoring checks if the BLM Temperature Signal 2 is shorted to Ground.	BLM Temperature Signal 2 AND Number of times when line low voltage is consecutively detected	< 0.03 [V] >= 5	Ignition state ON	= True	0.600 [s]	Continuous	Type B, 2 Trips
Brake Master Cylinder Pressure Sensor										
Brake Master Cylinder Pressure Sensor Communication Failure	C2A16	All	This monitoring checks if the SENT line is shorted to supply, open or the ground is interrupted.	SENT line is shorted to supply	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the SENT line is shorted to ground or the sensor supply is interrupted.	SENT line is shorted to ground	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Pressure Sensor Out of Range High	C0572	All	This monitoring checks for Out-of-range high error codes on the Pressure Sensor's Sent Line 2.	Out of range high error code is present on SENT Line 2	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Pressure Sensor Out of Range Low	C0571	All	This monitoring checks for Out-of-range low error codes on the Pressure Sensor's Sent Line 2.	Out of range low error code is present on SENT Line 2	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Pressure Sensor Performance	C0574	All	This monitoring checks if the offset value of pressure sensor 1 is correct.	Offset value	> 12 [bar]	Ignition state ON AND Brake Pedal is released AND Acceleration AND Vehicle speed AND No active pressure build up by IPB-system	= True = True > 0 [m/s^2] > 4.47 [mph] = True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error at SENT line.	SENT internal error code is received from sensor	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip

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 Pedal Position Sensor A										
Brake Master Cylinder Piston Position Sensor "A" Circuit Range/Performance	C05CC	All	This monitoring checks if the offset of channel 1 of the Pedal Travel Sensor is out of defined range.	Push rod stroke offset OR Push rod stroke offset	> 1.1 [mm] < -1.5 [mm]	Ignition state ON AND PTS AND Brake Pedal AND Hydraulic Intervention EPS ACC AND Vehicle velocity AND Acceleration	= True = fault free = completely released = No intervention > Standstill (4.47 mph) > 0 [m/s^2]	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error on the SENT line.	SENT internal error code is received from sensor	>4088	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor 1 Circuit High Voltage	C05CA	All	This monitoring checks if the Linear Position Sensor sends an 'Out of range high' failure information via the fast channel of the SENT protocol.	Out of range high error message is transmitted	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor 1 Circuit Low Voltage	C05CB	All	This monitoring checks if the Linear Position Sensor sends an 'Out of range low' failure information via the fast channel of the SENT protocol.	Out of range low error message is transmitted	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Internal Communication Fault with Brake Master Cylinder Piston Position Sensor 1	C2A13	All	This monitoring checks if the ID of the Linear position sensor is received in time.	ID of the Linear position sensor is not received on time	>1.5 [s]	Ignition state ON	= True	0.500 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the SENT line is shorted to supply.	SENT line is shorted to supply	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the SENT line is shorted to ground.	SENT line is shorted to ground	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
Brake Pedal Position Sensor B										
Brake Master Cylinder Piston Position Sensor "A/B" Correlation	C05D0	All	This monitoring checks whether the difference between PTS1 and PTS2 signal is too high.	|PTS1 signal - PTS2 signal)	> 1.5 [mm]	Ignition state ON AND Sensor Channel 1 and Channel 2 AND Sensor Channel 1 and Channel 2	= True = initialized = fault free	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the brake pedal and the gas throttle are pressed at the same time by the driver for a defined input and time.	Brake input rod stroke AND Gas throttle	> 3 [mm] > 20%	Ignition state ON AND Vehicle speed AND Accelerator pedal is applied Signal is available and valid	= True > 4.47 [mph] = True	240 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Range/Performance	C05CF	All	This monitoring checks if the offset of channel 2 of the Pedal Travel Sensor is out of defined range	Push rod stroke offset AND Push rod stroke offset	> 1.1 [mm] < -1.5 [mm]	Ignition state ON AND PTS AND Brake Pedal AND Hydraulic Intervention EPS ACC AND Vehicle velocity AND Acceleration	= True = fault free = completely released = No intervention > Standstill (4.47 mph) > 0 [m/s^2]	0.100 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Voltage High	C05CD	All	This monitoring checks if the PWM line is shorted to supply.	PWM line is shorted to supply OR Interruption of Sensor ground	= True = True	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Voltage Low	C05CE	All	This monitoring checks if the PWM line is shorted to ground.	PWM line is shorted to ground	= True	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
Internal Communication Fault with Brake Master Cylinder	C2A14	All	This monitoring checks if there is transmission error at PWM line.	PWM frequency OR	< 900 [Hz]	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip

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
Piston Position Sensor 2				PWM frequency OR PWM duty OR PWM duty	>1120 [Hz] < 8.5 [%] > 92 [%]					
Brake Pressure Sensor										
Brake Pressure Sensor Communication Failure	C2A15	All	This monitoring checks if the SENT line is shorted to supply, open or the ground is interrupted.	SENT line is shorted to supply	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the SENT line is shorted to ground or the sensor supply is interrupted.	SENT line is shorted to ground	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor Out of Range High	C053F	All	This monitoring checks difference between the measured pressure from the plunger pressure sensor and the calculated pressure based on motor torque, angular acceleration and best-case gear efficiency. When the measured pressure is higher than the calculated plus robustness margin then the failure is set.	Difference between the measured pressure and the calculated pressure	> calculated max pressure + 25 [%] from measured pressure. At least 20 [bar] robustness margin.	Ignition state ON AND Motor speed	= True > 3 [rad/s]	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks for Out-of-range high error codes on the Pressure Sensor's Sent Line 1.	Out of range high error code is present on SENT Line 1	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor Out of Range Low	C053E	All	This monitoring checks for Out-of-range low error codes on the Pressure Sensor's Sent Line 1.	Out of range low error code is present on SENT Line 1	= True	Ignition state ON	= True	0.960 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor Performance	C053D	All	This monitoring checks if the offset value of pressure sensor 2 is correct.	Offset value	> 12 [bar]	Ignition state ON AND Brake Pedal is released	= True = True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is transmission error at SENT line.	SENT internal error code is received from sensor	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor										
Brake Booster Motor "A" Over Temperature	C05C2	All	This monitoring checks if the rotor or ECU temperature is higher than a defined level.	ECU temperature	> 120 [°C]	Ignition state ON AND Brake Booster Temperature Sensors	= True = fault free	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the rotor or ECU temperature is higher than a defined level.	ECU temperature	> 142 [°C]	Ignition state ON AND Brake Booster Temperature Sensors	= True = fault free	Immediately	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Performance	C0594	All	This monitoring checks if the plunger can reach the mechanical backward bound.	Plunger travel	> Plunger length	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if motor test detects hardware failure.	Motor test detects HW failure	= True	Ignition state ON AND Motor is actuated	= True = False	0.010 [s]	Cyclically in every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if the motor movement is sufficient according to the expected pressure value.	Pressure sensor 2 value AND Calculated pressure - Pressure sensor 2 value	> 10 [bar] > 40 [bar]	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the motor movement is sufficient according to the expected pressure value.	Calculated pressure - Pressure sensor 2 value OR Pressure sensor 2 value - Calculated pressure	> 40 [bar] > 108 [bar]	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit/Open	C057F	All	This monitoring checks the motor coil resistance value.	Measured motor coil resistance	> 0.20358 [Ohm]	Ignition state ON	= True	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the motor coil resistance value.	Measured motor coil resistance	<0.01258 [Ohm]	Ignition state ON	= True	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the voltage vector is plausible.	Actual voltage vector - Calculated voltage vector	>1.5 [V]	Ignition state ON	= True	0.020 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Current High	C0590	All	This monitoring checks the offset (current value during no actuation) of the motor current measurement.	Current during idle mode	> 38 [A]	Ignition state ON AND Motor is actuated	= True = False	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the offset (current value during no actuation) of the motor current measurement.	Current during idle mode	> 38 [A]	Ignition state ON AND Motor is actuated	= True = False	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks that the motor current is not clamping at high threshold.	Phase Current 1	> 200 [A]	Ignition state ON	= True	0.300 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks that the motor current is not clamping at high threshold.	Phase Current 2	> 200 [A]	Ignition state ON	= True	0.300 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Current Low	C0591	All	This monitoring checks the offset (current value during no actuation) of the motor current measurement.	Current during idle mode	< -38 [A]	Ignition state ON AND Motor is actuated	= True = False	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the offset (current value during no	Current during idle mode	< -38 [A]	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip

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
			actuation) of the motor current measurement.			AND Motor is actuated	 = False			
		All	This monitoring checks that the motor current is not clamping at low threshold.	Phase Current 1	< -200 [A]	Ignition state ON	= True	0.300 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks that the motor current is not clamping at low threshold.	Phase Current 2	< -200 [A]	Ignition state ON	= True	0.300 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor Position Sensor										
Brake Booster Motor "A" Position Sensor Circuit High	C0589	All	This monitoring checks if the RPS cosine signal is out of range high.	Raw Cos ADC Value (Cos+ or Cos-) OR Sum Raw Cos ADC Values (Cos+ and Cos-)	>2795 >4327	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the RPS Sinus signal is out of range high.	Raw Sin ADC Value (Sin+ or Sin-) OR Sum Raw Sin ADC Values (Sin+ and Sin-)	>2795 >4327	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Position Sensor Circuit Low	C0588	All	This monitoring checks if the RPS cosine signal is out of range low.	Raw Cos ADC Value (Cos+ or Cos-) OR Sum Raw Cos ADC Values (Cos+ and Cos-)	< 1300 <3876	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the RPS Sinus signal is out of range low.	Raw Sin ADC Value (Sin+ or Sin-) OR Sum Raw Sin ADC Values (Sin+ and Sin-)	< 1300 <3876	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Position Sensor Circuit Range/Performance	C058A	All	This monitoring checks if there is a noise in the RPS vector length.	Oscillation of vector	>= 0.1025	Ignition state ON AND Motor is actuated	= True = True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the vector length value of RPS is out of range high	Calculated vector length (sin ^2+cos ^2)	> 1.2996	Ignition state ON AND Motor is actuated	= True = True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the vector length value of RPS is out of range low.	Calculated vector length (sin ^2+cos ^2)	< 0.6889	Ignition state ON AND Motor is actuated	= True = True	0.010 [s]	Continuous	Type A, 1 Trip
CAN Bus A										
Control Module Communication Bus "A" Off	U0073	All	This monitoring checks if the CAN controller is in a Bus Off state.	BusOff status has been detected	= True	Ignition state ON	= True	0.240 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if there is a timeout failure caused by HW-Error.	Expected action has not occurred within its allowed time	= True	Ignition state ON AND A CAN controller request has been issued	= True = True	Immediately	Continuous	Type B, 2 Trips
Lost Communication With ECM/PCM "A"	U0100	All	This monitoring checks if the message ETRS_General_Request_2_HS from ECM_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Drv_Pref_Mode_Switch_Status_HS from ECM_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Engine_General_Status_1_HS from ECM_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) AND Start Stop function is inactive	= True = True True	0.250 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the message PPEI_Engine_General_Status_4_HS from ECM_HS is received within a time range.	Message is not received for time	>=1.25 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	1.25 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the message PPEI_Engine_General_Status_6_HS from ECM_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Engine_Torque_Status_2_HS from ECM_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Engine_Torque_Status_3_HS from ECM_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Propulsion_Gen_Stat_1_HS from HCP_HSZ ECM_HS/ BCP-HS/ HCP B HS/ HCP_T_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 B, 2 Trips
		All	This monitoring checks if the message PPEI_Propulsion_Sys_Gen_Status from ECM_HS is received within a time range.	Message is not received for time	>=1.25 [s]	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	1.25 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the message PPEI_Torque_Request_Status_HS from ECM_HS is received	Message is not received for time	>= 0.250 [s]	Ignition state ON AND	= True	0.250 [s]	Continuous	Type B, 2 Trips

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
			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 PPEI_Trans_General_Status_2_HS from ECM_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 Start Stop function is inactive	= True = True True	0.500 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the message PPEI_Vehicle_Speed_and_Distance_HS from ECM_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	2.5 [s]	Continuous	Type B, 2 Trips
Lost Communication With Gateway "A"	U0146	All	This monitoring checks if the message PPEI_CGM_General_Status_HS from CGM 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 B, 2 Trips
Lost Communication With TCM	U0101	All	This monitoring checks if the message PPEI_Trans_General_Status_2_HS from TCM_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 Start Stop function is inactive	= True = True True	0.500 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the message PPEI_Transmission_Otpt_Rot_Stat_HS from TCM_HS/ HCP_T_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 B, 2 Trips
CAN Bus E										
Control Module Communication Bus "E" Off	U0077	All	This monitoring checks if the CAN controller is in a Bus Off state.	BusOff status has been detected	= True	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.090 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if there is a timeout failure caused by HW-Error.	Expected action has not occurred within its allowed time	= True	Ignition state ON AND A CAN controller reguest has been issued	= True = True	Immediately	Continuous	Type B, 2 Trips
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 A, 1 Trip
ABS Valves Supply Voltage Circuit/Open	C053B	All	This monitoring checks if the VLV Supply line is able to drive an actuation.	Resistivity of valve path supply line	> 3 [Ohm]	Ignition state ON AND Vehicle speed AND Brake Pedal	= True > 9.32 [mph] = not actuated	20 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the voltage is high enough for initial valve relay switch-on test.	UVR (Valve path supply voltage)	< 4.6 [V]	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
			This monitoring checks if the VLV Supply line is able to drive an actuation.	Resistivity of valve path supply line	> 3 [Ohm]	Ignition state ON AND Vehicle speed AND Brake Pedal	= True > 9.32 [mph] = not actuated	20 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the voltage is high enough for initial valve relay switch-on test.	UVR (Valve path supply voltage)	< 4.6 [V]	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
Brake Bleed Not Complete	C15C7	All	This monitoring checks if the IPB is in assembly mode during initialization or diagnosis.	NVM item for 'IPB Assembly Mode' is set	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit Range/Performance	C0582	All	This monitoring checks if the two sensor voltages have plausible values.	(Sum of the BLM Temperature Signal 1 and Signal 2 OR Sum of the BLM Temperature Signal 1 and Signal 2) AND Times implausible values detected)	> 3.43 [V] <2[V] >= 5	Ignition state ON	= True	0.600 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor Position Sensor Not Learned	C2A1C	All	This monitoring checks the consistency between the version of the RPS calibration data and the version in SW.	Inconsistency between RPS calibration data version and SW version	= True	IPB State	= Init phase	Immediately	Once	Type A, 1 Trip
Control Module	U3000	All	This monitoring checks if assertion failed error occurred according to the ANSI C standard at SW development.	Assertion failed	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the test of the charge pump has detected a failure.	Capacity of charge pump is restricted OR Performance of charge pump is insufficient	= True = True	Ignition state ON	= True	Immediately	Cyclically in every 19 [s]	Type A, 1 Trip

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
				OR Output voltage of charge pump is out of range	 = True					
		All	This monitoring checks if there is DMA transfer error due to timeouts.	Transfer error occurred during DMA transfer	= True	Ignition state ON	= True	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the reference voltage of the ADC is in a proper range.	ADC reference voltage OR ADC reference voltage	< 1.145 [V] > 1.345 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if MRG path is working.	MRG path test fails	= True	Ignition state ON	= True	0.080 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the system chip internal decouple bits are reset within the expected time.	Decouple bit is reset	= False	Ignition state ON AND Fail-safe logic test is running	= True = True	0.080 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the BIST can switch off electrically if wrong BIST commands have been received.	Number of wrong BIST commands after BIST did not switch off electrically	>= 3	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if Clockin monitor works properly (test of test).	Clockin failure status is not as expected	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the ECU electrical enable line can be switched ON by the software.	ECU internal electrical enable line has a short to ground OR The ECU internal electrical enable line cannot be switched ON by the software	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the ECU electrical enable line can be switched OFF by the software.	ECU internal electrical enable line has a short to supply voltage OR The ECU internal electrical enable line cannot be switched OFF by the software	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the ECU internal hydraulic enable line can be switched ON by the software.	ECU internal hydraulic enable line has a short to ground OR The ECU internal hydraulic enable line cannot be switched ON by the software	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the ECU internal hydraulic enable line can be switched OFF by the software.	ECU internal hydraulic enable line has a short to supply voltage OR The ECU internal hydraulic enable line cannot be switched OFF by the software	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the enable line is set properly.	Missing low level enable signal of ECU internal hydraulic line is detected for time OR Missing low level enable signal of ECU internal electrical line is detected for time	> 0.05 [s] > 0.05 [s]	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the enable line is set properly (second ASIC).	Missing low level enable signal of ECU internal hydraulic line is detected for time OR Missing low level enable signal of ECU internal electrical line is detected for time	> 0.05 [s] > 0.05 [s]	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Errorpin event counter works properly.	Errorpin event counter does not increment on error pin event	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if a missing watchdog trigger causes hydraulic/electric shutdown.	Missing BIST trigger does not switch off hydraulic/electrical path	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks whether the system chip switches off the gate actuation when it detects a missing watchdog trigger.	Valve relay gate is not switched off due to missing watchdog trigger	= True	Ignition state ON AND Fail-safe logic test is running	= True = True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the valve relay gate actuation is properly switched off via a Serial Peripheral Interface (SPI) command during the Fail-Safe Logic Test.	Valve relay gate is not switched off via SPI	= True	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks the status of the watchdog at initialization state.	Watchdog status differs from the expected status	= True	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks the status of the watchdog.	Watchdog status differs from the expected status	= True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the status of the watchdog (second ASIC).	Watchdog status differs from the expected status	= True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the watchdog BIST state machine can detect a wrong BIST command value.	Watchdog of the system chip is triggered by a wrong BIST command value	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if a switched on valve relay is reported as off (system chip internal status).	Valve relay gate does not switch on (or simply the feedback of system chip is wrong)	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the GTM time base which is used for e.g. WSS works properly.	Reference frequency from system ASIC OR Reference frequency from system ASIC	< 3.8 [kHz] > 4.2 [kHz]	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the 4 kHz reference frequency signal from system ASIC is in correct range.	Obtained frequency signal from system ASIC OR Obtained frequency signal from system ASIC	< 3.8 [kHz] > 4.2 [kHz]	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if System ASIC CLKIN input signal is outside of the specified frequency range.	ASIC internal CLKIN failure bit is set	= True	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if System 2nd ASIC CLKIN input signal is outside of the specified frequency range.	ASIC internal CLKIN failure bit is set	= True	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the ASIC can detect the failure test frames and therefore set corresponding failure flags.	ASIC could not detect the failure frames	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the 2nd ASIC can detect the failure test frames and therefore set corresponding failure flags.	Second ASIC could not detect the failure frames	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the internal ASIC oscillator works properly.	ASIC SPI register bit for Oscillator failure is set to	= 1	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the internal 2nd ASIC oscillator works properly.	Second ASIC SPI register bit for Oscillator failure is set to	= 1	Ignition state ON	= True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the SPI communication with B6 Bridge Driver ASIC.	B6 Bridge Driver ASIC could detect failure frames via SPI	= False	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is short circuit between Qx pin and MRAuC pin.	Short circuit between Qx pin and MRAuC pin	= True	Ignition state ON AND VR is not yet switched ON	= True = True	Immediately	Once	Type A, 1 Trip

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
						AND Hydraulic enable line is switched ON	 = True			
		All	This monitoring checks the SPI communication between ASIC and the microcontroller.	Length of received data does not match the length of sent data OR Calculated parity does not match the received parity bit OR Transmitted bit does not match bit in register OR Error frame is transmitted	= True = True = True = True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the SPI communication between 2nd ASIC and the microcontroller.	Length of received data does not match the length of sent data OR Calculated parity does not match the received parity bit OR Transmitted bit does not match bit in register OR Error frame is transmitted	= True = True = True = True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks for non-resolvable overcurrent events in the System ASIC.	Overcurrent bit of ASIC was set multiple times AND GPIO switched off until the next power cycle	= True = True	Ignition state ON	= True	60 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if U5V is out of range.	U5V undervoltage bit is set OR U5V overvoltage bit is set	= True = True	Ignition state ON	= True	0.060 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the ASIC internal test of the U5V voltage regulator.	U5V voltage comparator test did not finished in a defined timeslot	> 0.100 [s]	Ignition state ON	= True	0.100 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the voltage regulator configuration of the ASIC matches the software configuration.	Voltage regulator configuration of the ASIC does not match configuration in SW	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the ASIC internal current reference is out of range.	Current reference failure bit is set	= True	Ignition state ON	= True	0.060 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a voltage divider drift failure (UB_RD_INT voltage).	Difference between UB_Valve and UB_RD_INT	>3 [V]	Ignition state ON	= True	0.180 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the NMI mechanism is running properly.	No NMI occurred OR Not expected NMI occurred	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if tests of the safety logic of uC works as expected.	Microcontroller safety logic tests fail	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the supply voltage of the microcontroller is out of range.	Failure bit for microcontroller supply out of range is set	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the valve driver configuration was successful.	Valve driver configuration data read back from ASIC does not match the written data	= True	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the valve driver configuration was successful.	Valve driver configuration data read back from ASIC does not match the written data	= True	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if all Watchdog commands have been scheduled.	At least one WD trigger was not scheduled	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is too many wrong watchdog trigger pattern are received by system ASIC.	Number of the received watchdog error	>3	Ignition state ON	= True	0.040 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if the watchdog BIST state machine can detect a wrong BIST command value.	Watchdog of the system chip is triggered by a wrong BIST command value	= True	Ignition state ON	= True	0.030 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if System IC test does not work due to hardware malfunction.	WSS HW Test in System IC failed	= True	Ignition state ON	= True	0.015 [s]	Once	Type A, 1 Trip
		All	This monitoring checks line issues between ASIC and uC.	Wheel speed sensor signal and multiplexed wheel speed sensor signal are not identical	= True	Ignition state ON AND WSS Test has been finished AND Vehicle speed	= True = True >12.42 [mph]	0.100 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks the UB6 to UBB ratio together with the UBB Voltage.	UBB voltage measurement AND Ratio between UB6 and UBB	>4 [V] > 25 [%]	(Ignition state ON OR Ignition state OFF (Postrun)) AND Motor is actuated)	= True = True = True	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a hard undervoltage measured at UBB main supply line.	UB6 voltage AND UBB-UB6 voltage	< 3.22 [V] > 1.04 [V]	Ignition state ON AND Motor is actuated	= True = True	0.200 [s]	Continuous	Type A, 1 Trip
Control Module Processor	P0606	All	This monitoring checks if a third party software access into restricted RAM area is detected	Restricted area was tried to be accessed by DMC	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the PBC access to the actuators does not violate the rules.	Case 1: PBC release access time during not allowed situation	 > 10 [s]	Case 1: Ignition state OFF	 = True	10 [s]	Continuous	Type A, 1 Trip
				Case 2: PBC lock access time during not allowed situation	 > 30 [s]	Case 2: Ignition state ON AND Vehicle speed	 = True > 9.32 [mph]	30 [s]		
		All	This monitoring checks if the memory access area is correct.	PBC is accessing a forbidden memory area	= True	Ignition state ON AND PBC is active	= True = True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the hardware components are supported by the software.	Device ID of ASIC is in the list of supported device IDs OR Software version ID of ASIC is in the list of supported software version IDs OR Microcontroller device ID is in the list of supported device IDs OR	= False = False = False	Ignition state ON	= True	0.030 [s]	Once	Type A, 1 Trip

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
				Microcontroller software version ID is in the list of supported SW version IDs	= False					
		All	This monitoring checks if there is a microcontroller exception.	Data abort occurred OR Pre-fetch abort occurred OR Undefined instruction occurred	= True = True = True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks that each task is activated and executed within its designated timeslot.	OS detects that a task was not activated in expected time OR OS detects that a task was not executed within its timeslot	= True = True	Ignition state ON	= True	It depends on the cycle time of the faulty	Continuous	Type A, 1 Trip
		All	This monitoring checks the error hooks (exceptions) occurring in the Operating System.	Software program execution failure is detected	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if the microcontroller stack is not changed by other tasks.	Checkword at the beginning or end of stack has been overwritten	= True	Ignition state ON	= True	0.080 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if an interrupt fault has occurred.	Not supported software interrupt occurred OR Invalid interrupt occurred OR Interrupt lock release is called without previous lock OR Not all interrupts are released OR Interrupt lock time	= True = True = True = True > 0.001 [s]	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a task runtime overload.	Jitter time of 5 msec task	> 5 [%1	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is an overload situation.	Task did not finish within its cycle time	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks if cyclically test execution of SVDT in hardware is not stopped.	Stop response from hardware does not work or the test is not stopped	= True	Ignition state ON	= True	20 [s]	Cyclically every 20 [si	Type A, 1 Trip
		All	This monitoring checks that the task system of the microcontroller and the one of the ASIC stay synchronized or at least get resynchronized again.	Resynchronization between task system of microcontroller and ASIC fails	= True	Ignition state ON	= True	0.060 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if cyclically test execution of SVDT in hardware is not stopped.	Stop response from hardware does not work or the test is not stopped	= True	Ignition state ON	= True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks that the task system of the microcontroller and the one of the ASIC stay synchronized or at least get resynchronized again.	Resynchronization between task system of microcontroller and ASIC fails	= True	Ignition state ON	= True	0.060 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks for UVR leakage current due to ohmic side circuit by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Leakage current (UVR leakage current comparator bit is set) OR UVR goes from 0 [V] over 1.26 [V] within	> 0.0063 [A] = 0.06 [s]	Ignition state ON	= True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks the valve-coil resistance measurement path by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Driver ASIC internal current source	<> 0.04 [A] +1-5% (required source current)	Ignition state ON	= True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is short between VR and GND.	High ohmic short to GND bit in ASIC	= 1	Ignition state ON AND Valve Relay is switched OFF	= True = True	0.185 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is short between VR and GND.	Short to GND bit in ASIC is set to	= 1	Ignition state ON AND Valve Relay is switched OFF	= True = True	0.025 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the feedback of VRG actuation is plausible.	State of VRG Status via SPI does not fit to logical switch state	= True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	0.065 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF during the initial test.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched ON.	Valve Relay can be switched ON	= False	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched ON during the initial test.	Valve Relay can be switched ON	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF by redundant safety switch.	Valve Relay can be switched OFF by redundant safety switch	= False	Ignition state ON	= True	1 [si	Once	Type A, 1 Trip
		All	This monitoring checks for UVR leakage current due to ohmic side circuit by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Leakage current (UVR leakage current comparator bit is set) OR UVR goes from 0 [V] over 1.26 [V] within	> 0.0063 [A] = 0.06 [s]	Ignition state ON	= True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks the valve-coil resistance measurement path by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Driver ASIC internal current source	<>0.04 [A] +1-5% (required source current)	Ignition state ON	= True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is short between VR and GND.	High ohmic short to GND bit in ASIC	= 1	Ignition state ON AND Valve Relay is switched OFF	= True = True	0.185 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is short between VR and GND.	Short to GND bit in ASIC is set to	= 1	Ignition state ON AND Valve Relay is switched OFF	= True = True	0.025 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the feedback of VRG actuation is plausible.	State of VRG Status via SPI does not fit to logical switch state	= True	Ignition state ON	= True	0.050 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	0.065 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF during the initial test.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	1 [S]	Once	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched ON.	Valve Relay can be switched ON	= False	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched ON during the initial test.	Valve Relay can be switched ON	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the Valve Relay can be switched OFF by redundant safety switch.	Valve Relay can be switched OFF by redundant safety switch	= False	Ignition state ON	= True	1 [S]	Once	Type A, 1 Trip

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 Core 1 and Core 2 SW-BIST signatures are different.	Core 1 and Core 2 SW BIST signatures are different	= True	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the task scheme is proper.	A 5 ms task is not executed in every 5 ms	= True	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.200 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.200 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.200 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.200 [s]	Once	Type A, 1 Trip
		All	This monitoring checks if ASW configuration takes too long.	ASW current states stay in initialized state	= True	Ignition state ON	= True	5[s]	Continuous	Type A, 1 Trip
Control Module Programming Error	P0602	All	This monitoring checks if the ECU exchange was not proper.	Mismatch between the stored and the real LiPS ID	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the IPB has not been programmed with calibration data set.	5th Byte in internal customer data from any of the 5 pieces of calibration block	= ASCII 'D'	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the configuration of the wheel speed sensor type is possible.	Wheel speed sensor type value OR Wheel speed sensor type value OR NVM item is corrupted	>29 <0 = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
EBCM Overtemperature	C127E	All	This monitoring checks if there is an overtemperature at the external power supply line in the direction of LiPS.	Overtemperature situation detected by system ASIC at external LiPS power supply line	= True	Ignition state ON	= True	0.060 [s]	Continuous	Type A, 1 Trip
Internal Control Module A/D Processing Performance	P060B	All	This monitoring checks if there are general ADC errors of the operational conversion.	Parity error is registered OR ID error is registered OR Operational scan group has completed its conversion in time OR All operational results have been written before they are read	= True = True = False = False	Ignition state ON	= True	0.080 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there are open bonds or pins.	ADC open bond failure bit is set for number of times	>= 3	Ignition state ON	= True	0.080 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the converted internal test voltages are in a defined range.	ADC selftest failure bit is set for number of times	>= 3	Ignition state ON	= True	0.070 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if ADC register bits are set to the expected values.	An ADC register bit is flipped OR An ADC register bit is stuck	= True = True	Ignition state ON	= True	0.080 [s]	Continuous	Type A, 1 Trip
Internal Control Module EEPROM Error	P062F	All	This monitoring checks if LiPS-related NvM item can be written.	LiPS-related NvM item can not be written	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if there are too many read/write requests.	Number of read/write requests	> 100	Ignition state ON	= True	0.250 [s]	Continuous	Type A, 1 Trip
Internal Control Module Keep Alive Memory (KAM) Error	P0603	All	This monitoring checks if HW Parameter(s) can be read from EEPROM correctly.	Reading the HW Parameters from EEPROM is not successful	= True	Ignition state ON AND ECU Startup	= True = True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the NVM item for the front axle can be read or valid.	NVM item can be read OR NVM item is valid	= False = False	Ignition state ON AND Battery voltage	= True = between 9..16 [V]	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the Linear position sensor related NVM item can be read, or the item is valid.	LiPS-related NvM item is empty OR LiPS-related NvM item is invalid	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks the write result at the end of the EEPROM write procedure.	Invalid cell result received during read back after writing to the EEPROM	= True	Ignition state ON	= True	0.020 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the gear ratio information can be read out from the non-volatile memory.	Gear ratio information can be read out from the NVM OR Gear ratio information is correct	= False = False	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the motor size information can be read out from the non-volatile memory.	Motor Size information can be read out from the NVM OR Motor Size information is correct	= False = False	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks if the NvM items: RPS_Offset, RPS_Rescalling, RPS CorrAmplitudes and the RPS_Version are readable.	Offset read failure occurred OR Rescaling read failure occurred OR Correction Amplitudes read failure occurred OR Version read failure occurred OR Orthogonality read failure occurred	= True = True = True = True = True	IPB State	= Init phase	Immediately	Once	Type A, 1 Trip
Internal Control Module Memory Checksum Error	P0601	All	This monitoring checks proper functionality of Flash.	Uncorrectable Flash ECC fault occurred OR Number of Flash ECC correctable bit faults OR Flash checksum verification failed	= True >3 = True	Ignition state ON	= True	0.080 [s]	Continuous	Type A, 1 Trip

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
Internal Control Module Random Access Memory (RAM) Error	P0604	All	This monitoring checks if the LBIST and MBIST are working properly.	Test result bits set do no match reference register value OR Signature register values do no match reference register value	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		All	This monitoring checks proper functionality of RAM.	Uncorrectable RAM ECC fault occurred OR Number of RAM ECC correctable bit faults OR Coupling between neighbouring RAM cells OR RAM addressing fault occurred	= True >2 = True = True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
System Voltage High	P0563	All	This monitoring checks if the supply voltage is too high for the actuation.	Power supply voltage	> 16.5 [V]	Actuation (apply or release) has been requested	= True	2[s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	>16[V]	Ignition state ON	= True	0.200 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	> 20 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	> 27 [V]	Ignition state ON	= True	0.200 [s]	Continuous	Type B, 2 Trips
		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	>16[V] = True	Ignition state ON	= True	Immediately	Continuous	Type B, 2 Trips
		All	This monitoring checks if the power supply at valve path is too high.	UB.VR	> 16.5 [V]	Ignition state ON	= True	1.02 [s]	Continuous	Type B, 2 Trips
System Voltage High	P0563	All	This monitoring checks if there is an existing overvoltage situation while other LIN failure is present.	ECU Supply voltage AND Another LIN failure has been detected	>16[V] = True	Cranking	= False	Immediately	Continuous	Type B, 2 Trips
Wheel Speed Sensor Frequency	C10EE	All	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND WSS Test has been finished	= True = True	0.030 [s]	Continuous	Type A, 1 Trip
Hydraulic Valves										
Brake Booster Performance	C0021	All	This monitoring checks if the pressure in plunger circuit is too low.	Target pressure AND Pressure sensor 2 value	> 60 [bar] < 30 [bar]	Ignition state ON AND Braking is requested (either by driver or by external) AND BBF System state	= True = True = Full	0.300 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks with goodcheck if the pressure in plunger circuit is too low.	Target pressure AND Pressure sensor 2 value	> 60 [bar] < 30 [bar]	Ignition state ON AND Braking is requested (either by driver or by external)	= True = True	0.300 [s]	Continuous	Type A, 1 Trip
Brake Hydraulic Circuit "C" Leak	C05B0	All	This monitoring checks if there is air in the plunger. It checks the system during three situation: - during replenishment (Replenishment air detection, RAD) - during TAD (Transition to idle air Detection, TAD) - active test after power on (Fluid level indicator Plausibility aur detection, FAD).	Case 1 - RAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND For time	> 2 [cm^3] >1 [s]	Case 1: BBF System state AND Replenishment is active AND Pressure sensor 1 value AND Ignition state ON	= Circuit separation OR One circuit = True >10 [bar] = True	0.020 [s]	RAD: At each slow replenishment in degraded state. TAD: At each pressure based TTI in degraded state. FAD: At least once per power cycle.	Type A, 1 Trip
				Case 2 - TAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND For time	> 1.5 [cm^3] >5[s]	Case 2: BBF System state AND TTI (Transition to Idle) is active for the plunger AND Pressure sensor 1 value AND Ignition state ON	= Full system OR Degraded pedal feel OR Circuit separation OR One circuit = True >10 [bar] = True	0.020 [s]		
				Case 3 - FAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND For time	> 1.5 [cm^3] > 10 [s]	Case 3: BBF System state AND Braking is requested (either by driver or by external) AND Vehicle speed AND Pressure sensor 1 value AND Ignition state ON	= Full system OR Degraded pedal feel OR Hydraulic backup with actuators = False = 9.32.. 43.5 [mph] >10 [bar] = True	0.020 [s]		
Brake Hydraulic Circuit Blocked	C12F9	All	This monitoring checks if circuit stiffness in the plunger circuit is too high.	Pressure sensor 2 value	> target pressure + 50 bar [bar]	BBF System state AND Braking is requested (either by driver or by external) AND	= Full system OR Degraded pedal feel OR Circuit separation OR One circuit = True	0.200 [s]	Continuous depending on the brake cycle	Type A, 1 Trip

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
						Pressure sensor 2 value	> 3 [bar]			
		All	This monitoring checks if circuit stiffness in the plunger circuit is too high.	Pressure sensor 2 value	> target pressure + 50 bar [bar]	BBF System state AND Braking is requested (either by driver or by external) AND Pressure sensor 2 value AND STF_HardCircuit is set	= One circuit = True > 3 [bar] = True	0.200 [s]	Continuous depending on the brake cycle	Type A, 1 Trip
Brake Hydraulic Circuit Excessive Compliance - Level 2	C2A20	All	This monitoring checks if there is a leakage in Circuit 1.	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)	= Circuit separation = True	0.100 … 0.500 [S]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a leakage in Circuit 1.	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)	= Circuit separation = True	0.100 … 0.500 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a leakage in Circuit 2.	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)	= Circuit separation = True	0.100 …0.500 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a leakage in Circuit 2.	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)	= Circuit separation = True	0.100 … 0.500 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a leak in the remaining single circuit.	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)	= One circuit = True	0.100 … 0.500 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is a leak in the plunger circuit.	Calculated leakage based on pressure sensor 2 value and plunger position	> 2000 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Full = True	0.100 …0.500 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Cut Off Valve	C05D5	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set	= True = False	20 [si	Cyclically every 20 [S]	Type A, 1 Trip

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
						AND Any valve test is activated	 = False			
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Brake Pedal Feedback Pressure Solenoid Circuit	C0024	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] > 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9[V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	< 2 [V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 6.9 [Ohm] < 2.2 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
BSCM/EBBC Hydraulic Unit Performance	C055F	All	This monitoring checks if there is a leakage in the Master Cylinder.	Calculated leakage	> 200 [mm ^3/s]	BBF System state AND Brake Pedal AND Pressure sensor 1 value	= Full = applied > 3 [bar]	Immediately	Continuous	Type A, 1 Trip
		All	This monitoring checks for signs of an inoperable or blocked Test Separation, Circuit Separation or Plunger Separation valve.	Active System Test (component STS) detects an unexpected pressure build-up	= True	System State AND BBF System state AND Braking is requested (either by driver or by external)	= Postrun = Full OR Degraded pedal feel = False	8[s]	Once in Postrun	Type A, 1 Trip
		All	This monitoring checks if brake boosting capability is lost.	Calculated air volume (based on Pressure sensor AC value and plunger position) AND Calculated leakage	>= 8 [cm^3] > 800 [mm ^3/s]	BBF System state AND Braking is requested (either by driver or by external) AND	= Full OR Degraded pedal feel = False	4[s]	Once immediately after start of a new Power Cycle	Type A, 1 Trip

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
						Vehicle speed	< 156.6 [mph]			
		All	This monitoring checks if the pressure build capability is reduced.	Calculated air in plunger	> 5 [cm^3]	BBF System state AND Braking is requested (either by driver or by external) AND Vehicle speed	= Full OR Degraded pedal feel = False <156.6 [mph]	4[s]	Once immediately after start of a new Power Cycle	Type A, 1 Trip
		All	This monitoring checks if the pressure build capability is reduced.	Calculated leakage	> 800 [mm ^3/s]	BBF System state AND Braking is requested (either by driver or by external) AND Vehicle speed	= Full OR Degraded pedal feel = False <156.6 [mph]	4[s]	Once	Type A, 1 Trip
		All	This monitoring checks if the pressure build up during replenishment is possible.	Pressure sensor 2 value gradient AND Plunger volume	< 300 [bar] > plunger volume at start of replenishment + 1 cm ^3	Ignition state ON AND Replenishment is active	= True = True	0.200 [s]	Continuous	Type A, 1 Trip
Driver Applied Pressure Higher Than Expected	C05D3	All	This monitoring checks if the current pressure sensor value is too high for the current Pedal Travel Sensor value.	Pressure sensor value* OR Pedal Travel Sensor value	> too high < too low	Ignition state ON AND ESP or ABS intervention	= True = No intervention	0.200 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if the current pressure sensor value is too high for the current Pedal Travel Sensor value.	Pressure sensor value* OR Pedal Travel Sensor value	> too high < too low	Ignition state ON AND ESP or ABS intervention	= True = No intervention	0.200 [s]	Continuous	Type A, 1 Trip
Left Front Inlet Control	CO010	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	< 2 [V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9[V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip

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
Left Front Outlet Control	C0011	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	< 2 [V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True >6.9[V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Left Rear Inlet Control	C0018	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip

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 continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	< 2 [V] >0.075 -0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
Left Rear Outlet Control	C0019	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	< 2 [V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Anv valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip

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 cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Right Front Inlet Control	C0014	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Right Front Outlet Control	C0015	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9[V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip

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
				OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]					
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075 -0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
Right Rear Inlet Control	C001C	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075 -0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR	= True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip

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
				Failure in PWM compare unit	= True					
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True >6.9[V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Right Rear Outlet Control	C001D	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
TCS Control Channel "A" Valve 1	C0001	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR	<2[V] < 0.075 -0.125 [A]	Ignition state ON AND Valve relay supply voltage AND	= True >6.9[V]	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip

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
				Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Outside of valve control AND Hydraulic request is set	= True = False			
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9[V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver	Failure in actuation logic and actuation compare logic	= True	Ignition state ON	= True	20 [s]	Cyclically every 20	Type A, 1 Trip

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
			actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True	AND Outside of valve control	= True		[S]	
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve- Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 ..2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True >6.9[V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
TCS Control Channel "A" Valve 2	C0002	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip

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 cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] > 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075 -0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 6.9 [Ohm] < 2.2 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
TCS Control Channel "B" Valve 1	C0003	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR	<2[V]	Ignition state ON AND	= True	0.03 [s]	Continuous	Type A, 1 Trip

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
				Current (Linder Current feedback bit is set)	>0.075-0.125 [A]	Any valve test is activated	= False			
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True >6.9[V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2 [V] >0.075-0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip

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 continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2[V] < 0.075 -0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V] > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9[V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] < 4.8 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
TCS Control Channel "B" Valve 2	C0004	All	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set) OR Current through low-side driver (Over Current feedback bit is set) OR Temperature (Over Temperature feedback bit is set) OR Voltage drop between PGND at the low-side driver and ECU-Gnd (PGND-Lost feedback bit is set) OR Voltage at Qx (Free Wheeling Lost feedback bit is set) OR	< 2 [V] < 0.075 -0.125 [A] > 5 - 8 [A] > 195-220 [°C] > 0.4 - 0.9 [V] > Clamping voltage (35 .. 40) - (0.6 .. 2.2) [V]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip

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
				Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 20 [%]					
		All	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True > 6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at lowside in off-state (Open Load feedback bit is set) OR Current (Under Current feedback bit is set)	<2[V] >0.075-0.125[A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 6.9 [Ohm] < 2.2 [Ohm]	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in LS ADC measurement OR Failure in HS ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control	= True = True	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks if there is leakage current through valve-output-driver stage after valve actuation.	Leakage current through valve (masurement done ASIC-internally)	> 0.1 [A]	Ignition state ON AND Hydraulic request is set AND Any valve test is activated	= True = False = False	20 [s]	Cyclically every 20 [S]	Type A, 1 Trip
		All	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC Valve Driver Failure crosstalk OR Stuck at failure between or inside one ASIC Valve Driver actuation register OR Unexpected ASIC Valve Driver feedback	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Hydraulic request is set	= True > 6.9 [V] = False	20 [s]	Cyclically every 20 [s]	Type A, 1 Trip
Ignition Switch Run Crank Line										
Ignition On/Start Switch Circuit High Voltage	P2535	All	This monitoring checks if the Ignition Switch Circuit is short to Battery.	Hardwired ignition switch circuit AND Engine controller run crank terminal status from CAN	>4.5 [V] = Low	None	None	2 5 [s]	Continuous	Type A, 1 Trip
Ignition On/Start Switch Circuit Low Voltage	P2534	All	This monitoring checks if the Ignition Switch Circuit is interrupted or short to GND.	Hardwired ignition switch circuit AND Engine controller run crank terminal status from CAN	<2[V] = High	None	None	2.5 [s]	Continuous	Type A, 1 Trip
Ingition/ACC										
Ignition Switch Accessory Position Circuit Low	P2537	All	This monitoring checks if the Ignition Switch Accessory Circuit is interrupted or short to GND.	Run Crank Wakeup line AND (Accessory Line	= High < 2 [V]	None	None	0.5 [s]	Once	Type B, 2 Trips
Wheel Speed Sensors										
Left Front Wheel Speed Sensor Circuit High	C0503	All	This monitoring checks if there is a short circuit of the WSS Front Left signal line to the battery.	Sensor current at the signal line	> 0.05 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		With old ASIC type	This monitoring checks if there is a short circuit of the WSS Front Left supply line to the battery.	Current at sensor supply line AND ASIC revision ID	> 0.0336 [A] < "DA"	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor Circuit Low	C0502	All	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current Value Monitoring detects failure AND Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False = False	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is supply line short to ground or interruption failure in case of WSS Front Left.	Current at sensor supply line OR Current at sensor supply line	< 0.055 [A] >0.16[A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor Circuit/Open	C0500	All	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Front Left line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor Incorrect Component Installed	C0555	DF11i BoschVDA ContiVdaR	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	= False	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip
		DF11s	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	= True	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip

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
Left Front Wheel Speed Sensor Intermittent/Erratic	C0504	All	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND WSS Test has been finished	= True = True	0.030 [s]	Continuous	Type A, 1 Trip
		BoshVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Front Left.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor Range/Performance	C0501	DF11i BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the rotation wheel and the FL sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 [T] >= 5	Ignition state ON AND WSS test is finished AND Vehicle speed	= True = True > 1.24 [mph]	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	Type B, 2 Trips
		DF11i BoschVDA ContiVdaR	This monitoring checks if a missing stop pulse from WSS Front Left detected.	Missing stop pulse is detected	= True	Ignition state ON AND WSS Test has been finished AND Sensor supply voltage	= True = True >6 [V]	3.6 [s]	Continuous	Type B, 2 Trips
		BoschVDA	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	ECU supply line AND WSS supply line	<9[V] <5.15[V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		ContiVdaR	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	ECU supply line AND WSS supply line	< 9.3 [V] < 5.65 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		DF11s DF11I	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	ECU supply line AND WSS supply line	< 7.2 [V] < 5.15 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the system can recognize a WSS FL line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.050 [s]	Once	Type B, 2 Trips
		All	This monitoring checks the amount of the magnetic poles of the WSS FL tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21.. 37.28 [mph] = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		All	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 <1-2 [s] > 500 [m/s^2] > 4 >= 3 = 0.005 [s]	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the difference between the wheel speed sensor signals and WSS FL is within a valid range.	Case 1: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	 = True <12.43 [mph] < 20 [deg/s]	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: (Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	 = True >12.43 [mph] < 20 [deg/s]	9-18 [s]		
				Case 3: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	 = True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: (Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	 = True >=62.13 [mph]	9-18 [s]		
				Case 5: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS	 = True >2	72 [s]		

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
						OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	 = True >3 = True			
		All	This monitoring checks if there is a lost Wheel Speed Sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] > 7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.500 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] > 11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aquaplaning	 = True > 34.67 [mph] = False	0.080 [s]		
Left Rear Wheel Speed Sensor Circuit High	C050F	All	This monitoring checks if there is a short circuit of the WSS Rear Left signal line to the battery.	Sensor current at the signal line	> 0.05 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		With old ASIC type	This monitoring checks if there is a short circuit of the WSS Rear Left supply line to the battery.	Current at sensor supply line AND ASIC revision ID	> 0.0336 [A] < "DA"	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Circuit Low	C050E	All	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current Value Monitoring detects failure AND Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False = False	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is supply line short to ground or interruption failure in case of WSS Rear Left.	Current at sensor supply line OR Current at sensor supply line	< 0.055 [A] >0.16 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Circuit/Open	C050C	All	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Rear Left line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Incorrect Component Installed	C0557	DF11i BoschVDA ContiVdaR	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	- False	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Intermittent/Erratic	C0510	All	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND WSS Test has been finished	= True = True	0.030 [s]	Continuous	Type A, 1 Trip
		BoshVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Rear Left.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Range/Performance	C050D	DF11i BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the rotation wheel and the RL sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 [T] >=5	Ignition state ON AND WSS test is finished AND Vehicle speed	= True = True > 1.24 [mph]	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	Type B, 2 Trips
		DF11i BoschVDA ContiVdaR	This monitoring checks if a missing stop pulse from WSS Rear Left detected.	Missing stop pulse is detected	= True	Ignition state ON AND WSS Test has been finished AND Sensor supply voltage	= True = True >6[V]	3.6 [s]	Continuous	Type B, 2 Trips
		BoschVDA	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	ECU supply line AND WSS supply line	<9[V] < 5.15 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		ContiVdaR	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	ECU supply line AND WSS supply line	< 9.3 [V] < 5.65 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	ECU supply line AND WSS supply line	<7.2[V] < 5.15 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the system can recognize a WSS RL line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.050 [s]	Once	Type B, 2 Trips
		All	This monitoring checks the amount of the magnetic poles of the WSS RL tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON	= True	Immediately after	Continuous	Type B, 2 Trips

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
						AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	 = 6.21. .37.28 [mph] = False = False	recognizing the 10th gap		
		All	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 <1.2 [s] > 500 [m/s^2] >4 >=3 = 0.005 [s]	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the difference between the wheel speed sensor signals and WSS RL is within a valid range.	Case 1: (Difference between maximum and minimum wheel speed)	 > 4.02 [mph]	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	 = True <12.43 [mph] < 20 [deg/s]	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: (Difference between maximum and minimum wheel speed)	 > 6.5 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	 = True <12.43 [mph] < 20 [deg/s]	9-18 [s]		
				Case 3: (Difference between maximum and minimum wheel speed)	 > 4.02 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	 = True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: (Difference between maximum and minimum wheel speed)	 > 6.5 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	 = True >=62.13 [mph]	9-18 [s]		
				Case 5: (Difference between maximum and minimum wheel speed)	 > 4.02 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	 = True >2 = True >3 = True	72 [s]		
		All	This monitoring checks if there is a lost Wheel Speed Sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] > 7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.500 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] > 11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aquaplaning	 = True > 34.67 [mph] = False	0.080 [s]		
Right Front Wheel Speed Sensor Circuit High	C0509	All	This monitoring checks if there is a short circuit of the WSS Front Right signal line to the battery.	Sensor current at the signal line	> 0.05 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		With old ASIC type	This monitoring checks if there is a short circuit of the WSS Front Right supply line to the battery.	Current at sensor supply line AND ASIC revision ID	> 0.0336 [A] < "DA"	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Circuit Low	C0508	All	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault	Current Value Monitoring detects failure AND	= False	Ignition state ON AND	= True	0.120 [s]	Continuous	Type A, 1 Trip

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
			(such as supply to ground which are covered by other monitorings) or valid signal.	Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False	WSS Test has been finished	= True			
		All	This monitoring checks if there is supply line short to ground or interruption failure in case of WSS Front Right.	Current at sensor supply line OR Current at sensor supply line	< 0.055 [A] >0.16 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Circuit/Open	C0506	All	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Front Right line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Incorrect Component Installed	C0556	DF11i BoschVDA ContiVdaR	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	= False	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip
		DF11s	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	= True	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Intermittent/Erratic	C050A	All	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND WSS Test has been finished	= True = True	0.030 [s]	Continuous	Type A, 1 Trip
		BoshVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Front Right.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Range/Performance	C0507	DF11i BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the rotation wheel and the FR sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 [T] >=5	Ignition state ON AND WSS test is finished AND Vehicle speed	= True = True > 1.24 [mph]	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	Type B, 2 Trips
		DF11i BoschVDA ContiVdaR	This monitoring checks if a missing stop pulse from WSS Front Right detected.	Missing stop pulse is detected	= True	Ignition state ON AND WSS Test has been finished AND Sensor supply voltage	= True = True > 6 [V]	3.6 [s]	Continuous	Type B, 2 Trips
		BoschVDA	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	ECU supply line AND WSS supply line	<9[V] <5.15[V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		ContiVdaR	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	ECU supply line AND WSS supply line	< 9.3 [V] < 5.65 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		DF11s DF11i	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	ECU supply line AND WSS supply line	<7.2[V] <5.15[V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the system can recognize a WSS FR line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.050 [s]	Once	Type B, 2 Trips
		All	This monitoring checks the amount of the magnetic poles of the WSS FR tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21..37.28 [mph] = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		All	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 <1-2[s] > 500 [m/s^2] > 4 >= 3 = 0.005 [s]	Ignition state ON	= True	20 [s]	Continuous	TypeB, 2 Trips
		All	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the difference between the wheel speed sensor signals and WSS FR is within a valid range.	Case 1: [Difference between maximum and minimum wheel speed|	> 4.02 [mph]	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	= True <12.43 [mph] < 20 [deg/s]	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: [Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 2: Ignition state ON	= True	9-18 [s]		

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
						AND Vehicle speed AND Curve driving	>12.43 [mph] < 20 [deg/s]			
				Case 3: [Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	= True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: [Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	= True >=62.13 [mph]	9-18 [s]		
				Case 5: [Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	= True >2 = True >3 = True	72 [s]		
		All	This monitoring checks if there is a lost Wheel Speed Sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	= 0 [mph] > 7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	= True = False = True	0.500 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	= 0 [mph] > 11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	= True = False	Immediately		
				Case 3: Wheel acceleration	< -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aquaplaning	= True > 34.67 [mph] = False	0.080 [s]		
Right Rear Wheel Speed Sensor Circuit High	C0515	All	This monitoring checks if there is a short circuit of the WSS Rear Right signal line to the battery.	Sensor current at the signal line	> 0.05 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		With old ASIC type	This monitoring checks if there is a short circuit of the WSS Rear Right supply line to the battery.	Current at sensor supply line AND ASIC revision ID	> 0.0336 [A] < "DA"	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Circuit Low	C0514	All	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current Value Monitoring detects failure AND Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False = False	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
		All	This monitoring checks if there is supply line short to ground or interruption failure in case of WSS Rear Right.	Current at sensor supply line OR Current at sensor supply line	< 0.055 [A] >0.16 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Circuit/Open	C0512	All	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Rear Right line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND WSS Test has been finished	= True = True	0.120 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Incorrect Component Installed	C0558	DF11i BoschVDA ContiVdaR	This monitoring checks if a wrong Wheel Speed Sensor type is mounted.	Stop pulse according to WSS protocol is detected	= False	Ignition state ON AND WSS Test has been finished	= True = True	3[s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Intermittent/Erratic	C0516	All	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND WSS Test has been finished	= True = True	0.030 [s]	Continuous	Type A, 1 Trip
		BoshVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Rear Right.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Range/Performance	C0513	DF11i BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the rotation wheel and the RR sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 [T] >= 5	Ignition state ON AND WSS test is finished AND Vehicle speed	= True = True > 1.24 [mph]	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	TypeB, 2 Trips

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
		DF11i BoschVDA ContiVdaR	This monitoring checks if there is a missing stop pulse from WSS Rear Right detected.	Missing stop pulse is detected	= True	Ignition state ON AND WSS Test has been finished AND Sensor supply voltage	= True = True >6[V]	3.6 [s]	Continuous	Type B, 2 Trips
		BoschVDA	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	ECU supply line AND WSS supply line	<9[V] <5.15[V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		ContiVdaR	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	ECU supply line AND WSS supply line	< 9.3 [V] < 5.65 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	ECU supply line AND WSS supply line	<7.2[V] < 5.15 [V]	Ignition state ON	= True	0.060 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the system can recognize a WSS RR line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.050 [s]	Once	Type B, 2 Trips
		All	This monitoring checks the amount of the magnetic poles of the WSS RR tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21. .37.28 [mph] = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		All	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 <1-2 [s] > 500 [m/s^2] > 4 >= 3 = 0.005 [s]	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the difference between the wheel speed sensor signals and WSS RR is within a valid range.	Case 1: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	 = True <12.43 [mph] < 20 [deg/s]	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: (Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	 = True <12.43 [mph] < 20 [deg/s]	9-18 [s]		
				Case 3: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	 = True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: (Difference between maximum and minimum wheel speed)	> 6.5 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	 = True >= 62.13 [mph]	9-18 [s]		
				Case 5: (Difference between maximum and minimum wheel speed)	> 4.02 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	 = True >2 = True >3 = True	72 [s]		
		All	This monitoring checks if there is a lost Wheel Speed Sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] > 7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.500 [s]	Continuous	Type B, 2 Trips

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
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] > 11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aquaplaning	 = True > 34.67 [mph] = False	0.080 [s]		
Vehicle Speed - Wheel Speed Correlation	P215A	All	This monitoring checks if sensor signals seem to be affected by temporary failure suspicion at the same time to ensure the proper working of ABS functionality.	Number of sensor signal monitoring fault suspicions detected	>2	Ignition state ON	- True	0.500 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if the source of the invalid signal can be found.	|Difference between maximum and minimum wheel speed|	>52.12 [mph]	Ignition state ON AND Vehicle speed	= True >3.1 [mph]	9 - 72 [s]	Continuous	Type B, 2 Trips
		All	This monitoring checks if sensor signals seem to be affected by temporary failure suspicion at the same time to ensure the proper working of Vehicle Dynamic Control functionality.	Number of sensor signal monitoring fault suspicions detected	> 1	Ignition state ON	= True	0.100 [s]	Continuous	Type B, 2 Trips
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 A, 1 Trip
		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 A, 1 Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-10.0 Crank Degrees 10.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0340, P0341 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	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. 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. 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. For applications that have ability to move without engaging the internal combustion	**Engine Off:** 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	> 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature 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. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off** No Active DTCs:	>= 28,800.0 seconds >= 12.4 MPH < 15.0 deg C < 15.0 deg C >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. 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.	**Engine Running:** 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	> 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow 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 **P0071: OAT Performance Drive Equilibrium Engine Running** No Active DTCs:	>= 28,800.0 seconds >= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	Executed every 100 msec until a pass or fail decision is made	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		If the engine off component of the diagnostic was enabled, but did not make a pass or fail decision, the engine running component will begin executing when the internal combustion engine starts to run. 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. While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for						

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Too Low	P0087	Determine if rail pressure is below an absolute value.	Rail pressure	< 0 to 13 MPa (see table **P0087 Minimum rail pressure)**	Run crank voltage	> 11.0V	320 failures out of 457 samples 6.25 ms/sample	Type A, 1 Trips
					Engine running, cranking excluded, for a time	>= 30.00 s		
					No IFT running (refer to FUL_IFT_St)			
					No engine shut down request			
					LowFuelConditionDiagnostic	= FALSE		
					Fuel pressure estimated at high pressure pump inlet is valid			
					Fuel pressure estimated at high pressure pump inlet	>= 350.00 kPa		
					No DTC active:	FuelPumpRIyCktFA P0091 P2294 P2296		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Performance	P0089	Determine when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 67 to 217 MPa (see table **P0089 Maximum rail pressure with MU)**	Run crank voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntiT)*	> 11.0V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit	P0090	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve 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: impedance between signal and controller ground	> 200 kQ	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)* No active DTC since key is on: Powertrain relay voltage Run crank voltage Engine not cranking Metering Unit valve calibrated as present	> 11.0V FHP_MU_DrvrCloseTFTK 0 FHP_MU_DrvrOpenTFTK 0	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve 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: impedance between signal and controller ground	<0.5 Q	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)* No active DTC since key is on:	> 11.0V FHP_MU_DrvrCloseTFTK 0 FHP_MU_DrvrOpenTFTK 0	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit High Voltage	P0092	Controller specific output driver circuit diagnoses the Fuel Metering Unit valve 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: impedance between signal and controller power	<0.5 Q	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)* No active DTC since key is on:	> 11.0V FHP_MU_DrvrCloseTFTK 0 FHP_MU_DrvrOpenTFTK 0	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Circuit Performance (applications with IAT, IAT2 and IAT3)	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. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C <= 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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
			<u>Not Good Correlation, IAT in Middle</u> 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 IAT2) > ABS(Power Up IAT - Power Up IAT3)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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	
			<u>Not Good Correlation, IAT3 in Middle</u> Power Up IAT3 is between Power Up IAT and Power Up IAT2		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 Low	P0097	Detects a continuous short to ground in the Intake Air Temperature 2 (IAT2) signal circuit or an IAT2 sensorthat is outputting a frequency signal that is too low. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature 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 temperature value. A lower frequency is equivalent to a lower temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	< 13 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 High	P0098	Detects an Intake Air Temperature 2 (IAT2) sensor that is outputting a frequency signal that is too high. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature 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 temperature value. A higher frequency is equivalent to a higher temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	> 390 Hertz (-150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. 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. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Multiple Pressure Sensor Correlation Performance (3 intake air pressure sensor configuration)	P00C7	This monitor is used to identify if BARO, MAP and TCIAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the three sensors are not in agreement the monitor is not able to pinpoint the sensor(s) that is/are not working correctly and therefore indicates that there is a fault that impacts the three sensors.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [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 Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	>5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor	<= 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Circuit Performance	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. 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	**<u>Good Correlation Between IAT and IAT2</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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
			<u>Not Good Correlation, IAT in Middle</u> 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)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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	
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds	Executes once at the beginning of each ignition cycle if enable conditions are met	

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.	AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Se nsor_C kt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 Low	POOEA	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)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 High	POOEB	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)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Intermittent In-Range	POOEC	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. 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”. 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.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to ground in the humidity signal circuit or a humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit High	P00F5	Detects a humidity sensorthat is outputting a duty cycle signal that is too high. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	>=95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Intermittent	P00F6	Detects a noisy or erratic signal in the humidity circuit by monitoring the humidity sensor and failing the diagnostic when the humidity signal has a noisier output than is expected. 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”. 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. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure (MAP) Sensor Performance (3 intake air pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			MAP sensor OR MAP sensor OR Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	< 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:	>5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit Low (with pull-up)	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	< 3.3 % of 5 Volt Range (This is equal to 7.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0% of 5 Volt Range (This is equal to 390.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Performance (applications with IAT, IAT2 and IAT3)	P0111	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. 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. This diagnostic is executed once per	**Good Correlation Between IAT2 and IAT3** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C > 25 deg C <= 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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
			Not Good Correlation, IAT2 in Middle Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds 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	
			Not Good Correlation, IAT3 in Middle Power Up IAT3 is between Power Up IAT and Power Up IAT2		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >=11.0 Volts >= 0.9 seconds	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Low	P0112	Detects a continuous short to ground in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too low. The IAT 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 Input	< 58.00 Ohms (-150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too high. The IAT 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 Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant 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)	< 55 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine 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)	> 175,000 Ohms	Engine run time OR IAT min	> 10.0 seconds > -20.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine 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.	ECT temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the calculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid. ****************************	7.4 seconds -60.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ***************************** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when Ambient min is < 52 °C and >10 °C. Note: Warm up target for range #1 will be at least 71 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 11 °C when Ambient min is < 10 °C and >-9 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled *************************** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort *************************** *************************** If T-Stat Heater commanded duty cycle for this time period	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA EngineTorqueEstInaccurate > 1,800 seconds 20 < Eng Run Tme < 1,800 seconds Ethanol < 15 % > 0.93 miles *************************** 9,999 rpm 5.0 seconds *************************** *************************** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			55 °C ****************************** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 71 °C when Ambient min is < 52 °C and >10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is < 10 °C and >-9 °C. ******************************	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort **************************** ECT at start run	**************************** -40 < ECT < 52 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Performance (FTS wired to FTZM)	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	Averaged for absolute difference between fuel temperature and reference temperature is IF fuel fired heater has been used ELSE (see **P0181 Fuel Temperature Sensor Reference**)	>= 20.00 °C >= 20.00 °C	FTZM Run crank voltage A time and is passed since engine movement is detected Engine soak time No error for Engine Not Running timer (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to *"OBD Coolant Enable Criteria"* section)) Sensor Bus Relay commanded on No DTC active: At least one valid value received from serial communication	>8.0 > 6 s < 7.00 s > 28,800 s > -40 °C = TRUE FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBRRlyFA P1103	3 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit Low (FTS wired to FTZM)	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	<50 0	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0V > 11.0V > 8.00 SBRRIyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit High (FTS wired to FTZM)	P0183	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	> 121,865 0	Run crank voltage	> 6.0V	10 failures out of 20 samples	Type B, 2 Trips
					Run crank voltage	> 11.0V		
					Engine not cranking		100 ms/samples	
					FTZM Run crank voltage	> 8.00		
					Sensor Bus relay Commanded on			
					No DTC active	SBRRIyFA P1103		
					At least one valid value received from serial communication			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit Intermittent (FTS wired to FTZM)	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	> (1 - a) *156 °C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0V > 11.0V > 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBRRlyFA P1103	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - a) * -56 °C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 6.0V > 11.0V > 8.00 FTS_FTS_CktFA FTS_PlausRefSnsrFlt SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	<= 30 kPa	a) Diagnostic enabled [FDBR b FPSS DiagEnb ld] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTCP12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTCP129F] c8) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_lnfo1_UcodeCmFADTC P165C] c9) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	a) == TRUE b) >= 5.00 seconds c1)== TRUE c2) <> TRUE c3) <> TRUE c4] <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8) <> TRUE c9] <> TRUE	1 sample / 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					c10) Fuel Pump Duty Cycle Fault Active	c10) <>TRUE		
					c11) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c11) == CeFDBR_e_WiredTo_FTZM		
					c12) Sensor Bus Relay On	c12) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d)<> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == Normal Control OR == Fuel Pres Sensor Stuck Control		
					g) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	g) >= 0.05 gm/sec		
					h) Diagnostic System Disabled [DRER_b_DiagSysDsb]	h)<> TRUE		
					j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC]	j1)<> TRUE		
					j2) CAN Sensor Bus message $0C3_Available	j2) == TRUE		
					j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rollino Count and	j3) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *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_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_FTZM == 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_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_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see CaseI		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *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_FTZM == 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_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC_ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see CaseI		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Performance	P0191	Determine when fuel rail pressure sensor is not plausible, due to offset or drift.	Rail pressure sensor output (as percentage of supply voltage) OR Rail pressure sensor output (as percentage of supply voltage)	>14.0% < 6.5 %	Engine off time No error for Engine Not Running timer No engine movement detected since begin of driving cycle (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to *"OBD Coolant Enable Criteria"* section)) Run crank voltage Run crank voltage No active DTC:	≥ 35 s >-40 °C = TRUE > 6.0V > 11.0V ECT_Sensor_FA FHP_RPS_CktFA	42 failures out of 60 samples 6.25 ms/sample	Type A, 1 Trips
			Absolute difference between rail pressure #1 (first trace) and rail pressure #2 (second trace)	>21.0 MPa	**P0191 Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	= CeFHPG_e_RPS_DoubleTrack > 15 s > 8.4 V	33 failures out of 55 samples 6.25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTC:	FHP_RPS_CktFA FHP_RPS2_CktFA P0194		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Circuit Low Voltage	P0192	Determine when a short circuit to ground affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.3 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 >15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Circuit High Voltage	P0193	Determine when a short circuit to voltage affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 94.8%	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage	 >15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. **************************** Type cal above = 0 (non - heated t-stat) == == == == Engine coolant temperature **************************** Type cal above = 1 (Electrically heated t-stat) == == == == Engine coolant temperature	< 70.0 Deg C < 78.5 Deg C	No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ************************** Engine coolant temperature At least once during the key cycle Type 0 (non-heated t-stat) Type 1 (Electrically heated T-stat) ************************** Heat to coolant DFCO time Thermostat duty cycle RPM Active Fuel Management is not in	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR S WP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA >20.0 seconds >0.8 km > 55.0 kPa > -9.0 Deg C >71 Deg C >79.5 to 94.5 Deg C **Cool Down Diagnostic > Min Heat to Coolant** <5.0 seconds <100.0% <8,192 Half Cylinder Mode	48 seconds out of a 60 seconds window Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Open Circuit	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Open Circuit	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Open Circuit	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Open Circuit	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Open Circuit	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Open Circuit	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Open Circuit	P0207	This DTC checks the Injector 7 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 8 Open Circuit	P0208	This DTC checks the Injector 8 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderH and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing	P020D	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 4 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiE PSR_CylinderG and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

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

Injection Timing Control Circuit	P0216	This DTC detects an ECU internal fault, by comparing the cumulative injection pulse width provided by HWIO and the cumulative injection pulse width calculated by Application SW.
		A calibration is used to define the pulses that have to be taken into account to calculate the cumulative injection pulse width, both by HWIO and by application SW.
		Two different thresholds are defined for detecting the fault. The high threshold depends on the number of injection pulses active, i.e. the injection pulses driven and monitored.
			The cumulative injection pulse width (both HWIO and Application SW) is calculated by considering only the pulses to be monitored, defined in the calibration **P0216_ET_CumulEnbl**
			
			if (Cumulative injection pulse width read by HWIO > Cumulative injection pulse width calculated by Application SW)
			{
			|Cumulative injection pulse width read by HWIO-
			Cumulative injection pulse width calculated by Application SW|
			}
			else
			{
			|Cumulative injection pulse width read by HWIO-
			Cumulative injection pulse width calculated by Application SW|
			}
			
			OR
			information of dropped pulse reported by HWIO
			
			Cumulative injection pulse width calculated by
				> **P0216_PulsWidthErrHi** [us] depending on the number of injection pulses active
				
				> 80.00 [us]
					Test enabled by calibration;
					
					and
					Battery voltage
					
					and
					Key ON
					
					and
					No active DTC's:
					
					and
					At least one Injection Pulse is requested by the application software (FUL_FuelInjected
					
					and
						== 1.00 [Boolean]
						
						> 11.00 [V]
						
						-
						
						FULJnjCktTFTKO
						FUL_CntrlrStTFTKO
						FUL_BoostVoltTFTKO
						FUL_PullInErrTFTKO
						
						== TRUE);
							8 failures out of 128 samples
							
							or
							
							28 consecutive failures
							
							1 sample every cylinder firing
							
							Continuous
								Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Application SW is equal to the sum of the programmed pulses width and the end of injection period measurement provided by HWIO.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing	P021A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 7 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 7 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing	P021B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 8 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 8 provided by HWIO	< 0.00 [us] OR > 105.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiE PSR_CylinderD and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FULJnjCktTFTKO FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); -	38 failures out of 55 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] X **P0234, P2263: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] X **P0234, P2263: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	P0234, P0299: Boost pressure control deviation enabling==TRUE (see FreeFrorm) ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE >-20.00 [°C] AND <55.00 [°C] >-5 [kPa/s] AND <4 [kPa/s]	400 fail counters over 500 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed in range	>1,300.00 [rpm] AND <2,200.00 [rpm]		
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND < **P0234: Maximum boost pressure for overboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>70 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	>70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>=85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs All enabling conditions last for a time	DSL flags" Free Form) AIC_BstSysDiagDenomDsbl ==FALSE > **P0234: Overboost monitor delay timer** [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit Low Voltage	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit High Voltage	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit Low Voltage	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit High Voltage	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Control Circuit Low Voltage	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Control Circuit High Voltage	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Timing Performance	P026B	This DTC detects an injection timing only fault by comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR > 4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 3,000.00 == TRUE; - -	280.00 failures out of 400.00 samples 1 sample every engine revolution	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy not Enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit Low Voltage	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit High Voltage	P0271	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 4.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Control Circuit Low Voltage	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Control Circuit High Voltage	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit Low Voltage	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit High Voltage	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Control Circuit Low Voltage	P0279	This DTC detects a short circuit to ground of the low side driver circuit of Injector 7.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Control Circuit High Voltage	P0280	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 7.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 8 Control Circuit Low Voltage	P0282	This DTC detects a short circuit to ground of the low side driver circuit of Injector 8.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 8 Control Circuit High Voltage	P0283	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 8.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Underboost Condition	P0299	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent positive control deviation of the boost pressure indicating an underboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the underboost pressure monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to a leakage) that leads to exceed the emission	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) higher than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control active)** [kPa] X **P0299, P2263: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] X **P0299, P2263: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	P0234, P0299: Boost pressure control deviation enabling==TRUE (see FreeFrorm) ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE >-20.00 [°C] AND <55.00 [°C] >-5 [kPa/s] AND <4 [kPa/s]	400.00 fail counters over 500.00 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		limits.			Engine speed in range	> 1,250.00 [rpm] AND <2,000.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND < **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>70 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	>70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs All enabling conditions last for a time	DSL flags" Free Form) AIC_BstSysDiagDenomDsbl ==FALSE > **P0299: Underboost monitor delay timer** [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. 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 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 ***Undetectable region*** see Algorithm Description Document for additional details. 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 **> RufSCD_Decel** AND **> RufSCD_Jerk)** **> SCD_Decel** AND **> SCD Jerk)** **> RufCyl_Decel** AND **> RufCyl_Jerk)** **> CylModeDecel** AND **> CylModeJerk)** **>RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 °C < ECT Or if OBD Max Coolant Achieved = TRUE -9 °C < ECT < 131 °C < -9 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 131 °C 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Lores_Decel AND Lores_Jerk) 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 (LoresJDecel AND Lores_Jerk)	**> CylModeDecel * RandomCylModDecel** **> CylModeJerk * RandomCylModJerk** **> RevMode_Decel * RandomRevModDecl** **> RufSCDJDecel * Pair_SCD_Decel** **> RufSCD_Jerk * Pair_SCD_Jerk** **> SCD_Decel * Pair_SCD_Decel** **>SCD_Jerk * Pair_SCD_Jerk** **> RufCylJJecel * PairCylModeDecel** **> RufCyl_Jerk * PairCylModeJerk** **> CylModeDecel * PairCylModeDecel** **> CylModeJerk * PairCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Revmode Active AND (within one engine cycle: 2nd largest LoresJDecel)	**> CylModeDecel * PairCylModeDecel**				
			AND Above TRUE for))	> 35 engine cycles out of 100 engine cycles				
			BANK MISFIRE Cylinders above Bank Thresholds	>= 2 cylinders				
			(Medres_Decel	**> RufSCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> RufSCD_Jerk * Bank_SCD_Jerk**				
			OR (Medres_Decel	**> SCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> SCD_Jerk * Bank_SCD_Jerk**				
			OR (Lores_Decel	**> RufCyl_Decel * BankCylModeDecel**				
			AND Lores_Jerk)	**> RufCyl_Jerk * BankCylModeJerk**				
			OR (LoresJDecel	**> CylModeDecel * BankCylModeDecel**				
			AND Lores_Jerk)	**> CylModeJerk * BankCylModeJerk**				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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 AND CylBeforeDeacCyl_Jerk)	**> CylModeDecel * ClyAfterAFM_Decel** **> CylModeJerk * CylAfterAFM_Jerk** **> CylModeDecel * CylBeforeAFM_Decel** **> CylModeJerk * ClyBeforeAFM_Jerk** > 3 Engine Cycles **> CylModeDecel * ClyAfterAFM_Decel * RandomAFM_Decl** **> CylModeJerk * CylAfterAFM_Jerk * RandomAFM_Jerk** **> CylModeDecel * CylBeforeAFM_Decel * RandomAFM_Decl** **> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk** - see details on SuDoortino Tables Tab				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Misfire Percent Emission Failure Threshold	> 3.81 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	< 0 FTP rpm AND < 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 8,191 rpm AND > 199 % load AND <180 counts on one cylinder		
					Engine Speed	450 < rpm < ((Engine Over Speed Limit) - 250) OR 3,200) Engine speed limit is a function of inputs like Gear and temoerature	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						see **EngineOverSpeedLimit** in supporting tables		
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTK0 AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					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	0 cycle delay	
					Undetectable enaine	***Undetectable reaion***	4 cvcle delav	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					speed and engine load region	from Malfunction Criteria		
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	**< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	< 100.0% (< 100.0% in AFM) >318mph (>318mph AFM)	4 cycle delay	
					NEGATIVE TORQAFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCylJDecel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	**<DeacCylInversionDecel** **<DeacCylInversionJerk** > 4 cylinders	0 cycle delay	
					EGR Intrusive test	if Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 97.00 %	4 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Delay if PTO engaged	Enabled	4 cycle delay	
					******************************	******************************	******************	
					This Feature only used on Diesel engines			
					Combustion Mode	**= InfrequentRegen** value in Supporting Tables	4 cycle delay	
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque	> 199.99% Max Torque	4 cycle delay	
					******************************	******************************	******************	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:	**> "Ring Filter"** # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	**> "Number of Normals"** # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 enaine			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Cycle test to see if it looks like some disturbance like rough road (abnormal).)			
					Used Off Idle, and while not shifting,			
					TPS	> 199 %		
					Engine Speed	> 1,000 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation)			
					Consecutive decels while in SCD Mode	**> Abnormal SCD Mode**		
					Cyl Mode	**> Abnormal Cyl Mode**		
					Rev Mode	**> Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles.			
					abnormal candidates/ total candidates	>0.50 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed	580 < rpm < 6,800		
					Veh Speed	> 0.0 mph		
					The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Sinale Cvlinder Misfire			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)	> Misfire_decel * **1st_FireAftrMisfr_Acel** > Misfire_Jerk * **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddtjerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	3 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk *		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					repetative "misfire"	**SnapDecayAfterMisfire**		
						< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	>0.60	discard 100 engine cycle test	
					*****************************		******************	
					NON-CRANKSHAFT BASED ROUGH ROAD:	*****************************		
					Rough Road Source *****************************	Disabled	******************	
					IF Rough Road Source = WheelSpeedInECM	CeRRDR_e_None *****************************		
					ABS/TCS			
					Wheel speed noise		discard 100 engine cycle test	
					VSES	active		
						> WSSRoughRoadThres		
						active		
					AND No Emission Neutral Default Action DTCs	ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status		
					*****************************		******************	
					IF Rough Road Source = "FromABS"	*****************************		
					ABS/TCS		discard 100	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					RoughRoad VSES AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "TOSS" TOSS dispersion AND No Active DTCs ****************************** Default Action Isolator Resonance Default Action Option ****************************** If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	active detected active ABS Failed Vehicle Dynamics Control System Status ****************************** **>TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ****************************** Not Enabled ****************************** Set engine speed limits: 0 < Eng RPM < 9,000	engine cycle test ******************* discard 100 engine cycle test 4 cycle delay ******************* *******************	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	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	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 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		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	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		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:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle)	< 4 > 6	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:	CrankSensor_FA	Continuous every MEDRES event	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation (EGR) Flow insufficient	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the EGR flow monitor is to detect HP EGR obstructions (insufficient EGR flow). The EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, EGR cooler outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits. In particular environmental conditions where the provided EGR flow amount is not enough to have a robust monitoring, the EGR flow intrusive test can be enabled. When the intrusive test is	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant X **P0401: Insufficient EGR flow barometric table B (sea level)** [mg]) + (MidBaro Constant X **P0401: Insufficient EGR flow barometric table B (mid level)** [mg]) + (LoBaro Constant X **P0401: Insufficient EGR flow barometric table B (low level)** [mg]) + (SeaBaro Constant X	Calibration on diagnostic enabling HP EGR control is in closed loop on air flow OR LP EGR (if present) control is in closed loop on air flow OR Diagnostic enabled by calibration when HP/LP EGR control is in closed loop on HP/LP EGR flow Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| for a minimum number of samples	P0401, P0402: EGR flow monitor enabling == TRUE (see FreeForm) Referto "Other AICR DSL flags" Free Form 1.00 ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] <= 4 [rpm] >20 [counts]	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		enabled, a dedicated flow setpoint value is provided to air control.		**P0401: Insufficient EGR flow barometric table A (sea level)** [mg] X **P0401: Insufficient EGR flow barometric correction (sea level)**) + (MidBaro Constant X **P0401: Insufficient EGR flow barometric table A (mid level)** [mg] X **P0401: Insufficient EGR flow barometric correction (mid level)**) + (LoBaro Constant X **P0401: Insufficient EGR flow barometric table A (low level)** [mg] X **P0401: Insufficient EGR flow barometric correction (low level)**)	Fuel request is steady state: |FUEL-FUEL_old|	<= 0.50 [mm^3]		
					for a minimum number of samples	> 16 [counts]		
					An air control transition has ended OR Such condition is disabled by calibration	Refer to "Air Control Transition"Free Form OR 1.00 ==TRUE		
					No active transition from a combustion mode to another one	==TRUE		
					Throttle measured position	> 85.00 [%]		
					Outside Air Temperature	> -12.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 70.00 [°C] ==TRUE		
					Desired EGR flow	> **P0401: Minimum desired EGR flow** [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Desired fuel quantity	> **P0401: Insufficient EGR flow Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402: Outside air temperature" Free Form		
					No faults on proper temperature sensor	AIC_EGR_FlowDiagAirTempFA ==FALSE		
					All enabling conditions last for a time	> 7.00 [s]		
			Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< (SeaBaro Constant X **P0401: Insufficient EGR flow barometric table B (sea level)** [mg]) + (	Calibration on diagnostic enabling	**P0401, P0402: EGR intrusive test enabling** ==TRUE	400.00 fail counters over 500.00 sample counters	
					Difficult launch NOT detected	Refer to "LDT_DifficultLaunchActive" Free Form	sampling time is 25 ms	
					HP EGR control is in closed loop on air flow OR LP EGR (if present)	Refer to "Other AICR DSL flags" Free Form		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				MidBaro Constant X **P0401: Insufficient EGR flow barometric table B (mid level)** [mg])	control is in closed loop on air flow OR Diagnostic enabled by calibration when HP/LP EGR control is in closed loop on HP/LP EGR flow	1.00 ==TRUE		
				+	Engine Running	==TRUE		
				(LoBaro Constant X	Cranking ignition in range	Battery voltage > 11.00 [V]		
				P0401: Insufficient EGR flow barometric table B (low level) [mg])	PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
				+	Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
				(SeaBaro Constant X	Desired EGR rate	> 0 [%]		
				P0401: Insufficient EGR flow barometric table A (sea level) [mg]	Engine speed is steady state: |RPM-RPM_old|	<= 4 [rpm]		
				X **P0401: Insufficient EGR flow barometric correction (sea level)**	for a minimum number of samples	>20 [counts]		
				)	Fuel request is steady state: |FUEL-FUEL_old|	<=0.50 [mm^3]		
				+	for a minimum number of samples	> 16 [counts]		
				(MidBaro Constant X	An air control transition	Refer to "Air Control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P0401: Insufficient EGR flow barometric table A (mid level) [mg] X **P0401: Insufficient EGR flow barometric correction (mid level)**) + (LoBaro Constant X **P0401: Insufficient EGR flow barometric table A (low level)** [mg] X **P0401: Insufficient EGR flow barometric correction (low level)**)	has ended OR Such condition is disabled by calibration No active transition from a combustion mode to another one Throttle measured position Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Outside air temperature in range No faults on proper temperature sensor No faults on crank sensor or on fuel injection system	TransitionTree Form OR 1.00 ==TRUE ==TRUE > 85.00 [%] > -12.00 [°C] > 69.60 [kPa] > 70.00 [°C] ==TRUE Condition must be FALSE. Refer to "P0401, P0402: Outside air temperature" Free Form AIC_EGR_FlowDiagAirTempFA ==FALSE CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time since last EGR flow insufficient monitoring (standard test or intrusive test) test completion	> 0.00 [s]		
					Desired fuel quantity	> **P0401: Insufficient EGR intrusive test Min fuel enabling condition** [mm^3] AND < **P0401: Insufficient EGR intrusive test Max fuel enabling condition** [mm^3]		
					All enabling conditions above last for a time	> 0.00 [s]		
					All enabling conditions (included the above timer) last for a time	> 7.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Warm Up Catalyst Efficiency Below Threshold Bank 1 (OBD2, Cold start based monitor)	P0421	Cold start based monitor: the Catalyst (CC DOC) monitor only runs at cold start when dedicated conditions to detect this situation are satisfied. The diagnostic takes advantage of the HydroCarbon stored in the cold phase (the proper combination of combustion mode and injection pattern is requested in order to accumulate the proper amount of HC for performing a robust monitoring) and evaluates the energy produced by Catalyst during the following oxidation process (once that light-off temperature is fulfilled). The so calculated released energy is compared to the energy provided at CC DOC inlet in order to rescale the efficiency index value. Some corrections to minimize the results dispersion are finally applied. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA	Catalyst Efficiency Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Efficiency Index < Repass Threshold	Efficiency Index < **CatCrtdEffThrsh** [Curve] If EWMA Enbl Cal = 0.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Efficiency Index < **CatCrtdEffRepEWMA** [Curve]	**Catalyst monitor is enabled if:** - Catalyst monitor enabling calibrations = TRUE AND Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (DOC de-greened); AND - No active DTCs: Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst down temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Injection system not in fault (Fault Flag = FALSE) AND Ambient temperature information not in fault (Fault Active = FALSE) AND Vehicle speed information	**Catalyst monitor is enabled if:** Cat Monitor Enbl Cal = 0.00 [Boolean] AND ColdStartMonitorSelected = 0.00 [Boolean] AND DPF Rgn Cmpt >= 0.00 AND No active DTCs [Boolean]: Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (OAT_PtEstFiltFA) AND Veh Speed FA = NOT	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 0.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Standard) is supported by the Catalyst (CC DOC) monitor.			not in fault (Fault Active = FALSE) AND Catalyst down hydrocarbon estimation not in fault (Fault Flag = FALSE) AND Soaking time information not in fault (Fault Active = FALSE) AND Engine coolant temperature information not in fault (Fault Flag = FALSE) AND IF water desorption model compensation is enabled THEN specific humidity model not in fault AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Cold start conditions detected at key on: Enoine coolant	(VehicleSpeedSensor FA) AND Cat Dwn HC Fit = NOT (CAT_HC_CatDwnFlt) AND Eng Mode Not Run Timer = NOT (EngineModeNotRunTimer FA) AND Eng Cool Temp Fit = NOT (ECT_Sensor_FA & ECT_Sensor_TFTKO) AND IF water desorption model compensation enabled (0.00 [Boolean]) THEN WetExhSpcfcHumNotVld = NOT(EXM_WetExhSpcfcHumNotVld) AND Ambient conditions always satisfied while engine running [Boolean]: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Cold start conditions detected at key on [Boolean]:	- EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 0.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 0.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass - 0.00 [Counter]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature lower or equal than calibration AND Catalyst down exhaust temperature (by sensor) lower or equal than calibration AND Soaking time higher or equal than calibration AND Catalyst stored HydroCarbon quantity lower or equal than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle): Catalyst down estimated temperature (by 1dk thermal model) lower than calibration AND - Catalyst monitor not aborted in current driving cycle: Integration time (monitoring time) lower than calibration AND Integration time (monitoring time) higher or equal than calibration; AND monitor not completed in freezino state	Eng Cool Temp <= 100.00 [°C] AND Cat Dwn Temp Snsr <= 100.00 [°C] AND Soak Time >= 0.00 [s] AND Cat Stored HC <= 5.00 [g] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean]: Cat Dwn Temp (by 1dk thermal model) < 200.00 [°C] AND Catalyst monitor not aborted in current driving cycle [Boolean]: IntegrTime (MontrTime) >= 0.00 [s] AND IntegrTime (MontrTime) <200.00 [s]; AND when Cat Dwn Temp (by 1dk thermal model) =	elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						200.00 [°C] catalyst monitor integration is not frozen		
					AND - If enabled by cal, HC accumulation strategy never disabled	AND if HC accumulation strategy enable cal == TRUE (cal value = 0.00 [Boolean]) then AIC_CoolByp_DsblLateAf t == FALSE		
					Catalyst monitor integration is enabled if: - Catalyst up exhaust temperature (read by sensor) higher than calibration	**Catalyst monitor integration is enabled if:** Cat Up Temp Snsr > 80.00 [°C]		
					If Catalyst up exhaust temperature (read by sensor) lower than calibration, integration is reset	If Cat Up Temp Snsr < 50.00 [°C] integration is reset		
					- Catalyst down exhaust temperature (read by sensor) higher than calibration	Cat down Temp Snsr > 200.00 [°C]		
					If catalyst down exhaust temperature (read by sensor) lower than calibration, integration is reset	Cat down Temp Snsr < 1,000.00 [°C] integration is reset		
					Catalsyt monitor integration is frozen if: - Catalyst up exhaust flow lower than calibration	**Catalsyt monitor integration is frozen if:** Cat Up Exh Flow < 5.00 [g/s]		
					If Catalyst uo exhaust flow	If Cat Uo Exh Flow > 8.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					higher than calibration integration is re-enabled; - Current combustion mode is not suitable for monitor - engine is not running **Diagnostic test evaluation is triggered if:** - Catalyst down estimated temperature (by 1dk thermal model) higher or equal than calibration.	[g/s] integration is re-enabled; NOT (**Cold_Montr_Comb_ModeEnbl** in the position of the current combustion mode) = TRUE engine not running **Diagnostic test evaluation is triggered if:** Cat Dwn Temp (by 1dk thermal model) >= 200.00 [°C],		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Main Catalyst Efficiency Below Threshold Bank 1	P0422	The Second Catalyst (UF DOC) monitor only runs during DPF regeneration and compares the UF DOC released oxidation heat and the exhaust-injected fuel quantity (by HCI) both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Second Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Second Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that exhaust-injection (by HCI) is enabled during UF DOC monitor in order to produce enough exothermic heat across the Second Catalyst to evaluate the component conversion efficiency in a reliable way.	Second Catalyst Aging Index < Threshold If - Second Catalyst EWMA filter enabling calibration = TRUE AND - Second Catalyst conversion inefficiency previously detected (Second Catalyst Fault Active = TRUE) Then: Second Catalyst Aging Index < Repass Threshold	Aging Index < **Cat2_CrtdEffThrsh** [Curve] If EWMA Enbl Cal = 1.00 [Boolean] AND Second Catalyst FA = CAT_Cat2_SysEffLoB1_FA Then: Aging Index < **Cat2CrtdEffRepEWMA** [Curve]	- Second Catalyst monitor enabling calibration = TRUE AND No active DTCs: - Second Catalyst up temperature estimation not in fault (Fault Flag = FALSE) AND - Second Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; **Second Catalyst monitor status is DISABLED if:** - DPF regeneration disabled OR - HCI system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Second Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE)	Monitor Enbl Cal = 1.00 [Boolean] AND Cat2 Up Temp Estim Flt = NOT (EGT_TempCat2_UpFlt) AND Cat2 Dwn Temp Snsr Flt = NOT (EGT_SnsrCat2_DwnFlt); Samples nr. = 10.00 [Counter]; **Second Catalyst monitor status is DISABLED if:** DPF_DPF_St = SootLoading [Enumerative] OR HCI System Flt = HCI_GenericShtOffReq OR Amb Temp FA = CAT_OutsideTempFA OR Cat2 Up Exh Flow Flt = EXF_TotExhCat2_UpFlt	Task Time = 100 [ms] If - Second Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Second Catalyst EWMA filter enabling cailibration =	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Second Catalyst (UF DOC) monitor.			OR -Ambient conditions not always satisfied while engine running: Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; **Second Catalyst monitor status can move from DISABLED to TRIGGERED if:** - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND	OR -Ambient conditions not always satisfied while engine running: Amb Press < 69.90 [KPa] OR Amb Temp < 253.00 [K] OR Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhlnjDsbl = TRUE [Boolean]; **Second Catalyst monitor status can move from DISABLED to TRIGGERED if:** DPF_DPF_St # SootLoading [Enumerative] AND HCI System Flt = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND	TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status =	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Second Catalyst up exhaust temperature (by estimation) lower than calibration; **Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if:** - DPF regeneration	Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 255.99 [°C] AND Cat2 Up Temp Estim < 1,500.00 [K]; **Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if:** DPF DPF St#	EWMA Standard - 1 trip (with no malfunction) to report pass - 2.00 [Counter] elapsed trips (with no malfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Second Catalyst up exhaust temperature (by estimation) higher than calibration AND - Exhaust injection (by HCI) enabled AND - Second Catalyst up exhaust flow estimation	SootLoading [Enumerative] AND HCI System Flt = NOT (HCIGenericShtOffReq) AND Amb Temp FA = NOT (CATJDutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat2 Up Temp Estim > 675.00 [K] AND HCIJnjReleaseSt = TRUE [Boolean] AND Cat2 Up Exh Flow > 50.00 fo/sl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					higher than calibration AND - Exhaust injection fuel quantity (by HCI) higher than calibration; **Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if:** - Engine not running OR - Second Catalyst up exhaust flow estimation lower than calibration OR - Exhaust injection fuel quantity (by HCI) lower than calibration; **Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test**	AND Exh Inj Fuel Qnty (by HCI) > 0.01 [g]; **Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if:** - Engine not running OR Cat2 Up Exh Flow < 48.00 [g/s] OR Exh Inj Fuel Qnty (by HCI) < 0.01 [g]; **Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					evaluation trigger) if: - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Integrated exhaust injected fuel quantity (by HCI) higher than curve.	**evaluation trigger) if:** DPF_DPF_St # SootLoading [Enumerative] AND HCI System Flt = NOT (HCIGenericShtOffReq) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat2 Up Exh Flow Flt = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Exh Inj Fuel Qnty (by HCI)> **Cat2_CrtdMaxFuel** [g].		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	a) Sensed fuel volume change is b) while engine fuel consumption is	a) < 5 liters b) > 29.58 liters	1. Diagnostic Enabled 2. Engine Operational State	1. == True 2. == Running	250 ms / sample	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) [Non- EREV]	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: > 200 K Q impedance between signal and controller ground	Powertrain Relay Voltage	Voltage > 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan System Performance [Electro-Viscous Engine-Driven Fan Only]	P0483	Detects inability to control fan speed to desired RPM	Weighted filtered Cooling Fan Speed Differential [Measured - Commanded]	1. <= -588.00 RPM OR 2. >= 500.00 RPM	1. System Performance Test Triggered [FEAD b SysPerfTestTrig] 2. Commanded Cooling Fan Output Duty Cycle [FEAR_Pct_PWM_Output DutyCycle] 3a. Intake Air Temp Sensor Fault Active [DTCs P0112, P0113, P1111,P1112] 3b. Engine Coolant Temp Sensor FA [DTCs P0116, P0117, P0118, P0119, P1114, P1115] 3c. Cooling Fan Speed Sensor Circuit FA [DTC P0526] 3d. Cooling Fan FOD_OutputDriver_FA 3e. Ignition Sw Position Run_Crank Circuit voltage 3f. Induction Air Temp 4. System Performance Test enabled 5. Fan Speed Total Weighting Filtered Factor Calculation [See Supporting Calculation and Tables] P0483 Calculation - Total	1. == TRUE 2. >= 39.00 % 3a. <> TRUE 3b. <> TRUE 3c. <> TRUE 3d. <> TRUE 3e. >= 11.00 volts 3f. >= -20.00 degC 4. == TRUE 5. > 0.60 [dimensionless]	Fail condtion present >= 300.00 ; 100 ms / sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed High [Electro-Viscous Engine-Driven Fan Only]	P0495	Diagnoses the engine-driven cooling fan speed during OFF state against a rational speed accounting for inertia and ram-airflow effects	Measured Cooling Fan Speed	> Calculated Allowed Fan Drag Speed RPM	a) Diagnostic enabled b) Hydraulic Fan Clutch Pumped Out [FEAD_b_ClutchPumpedOut] c) Calculated Cooling Fan Speed [FEAD n FanDriveSpeed]	a) == TRUE b) == TRUE c) > 1,600.00 RPM	800.00 failures / 1,000.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (125 °C) Must verify KfECTI_T_EngCoolHotLoThresh (122) is less than KfECTI_T_EngCoolHotHiThresh (125)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	> 30 sec		
					Ignition voltage	32 > volts > 11		
					Time since gear change	> 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	< 1.24 mph		
					Commanded RPM delta	< 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 68.00 pct < 25.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IcmitionOutoutDriver FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (125 °C) Must verify KfECTI_T_EngCoolHotLoThresh (122) is less than KfECTI_T_EngCoolHotHiThresh (125)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	> 30 sec		
					Ignition voltage	32 > volts > 11		
					Time since gear change	> 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	< 1.24 mph		
					Commanded RPM delta	< 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 68.00 pct < 25.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqlntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemBI _FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSoeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed Sensor Circuit [Electro-Viscous Engine-Driven Fan Only]	P0526	Diagnoses the engine driven cooling fan speed sensor	Measured Cooling Fan Speed	< 4.00 RPM	a) Commanded Fan Output Duty Cycle [FEAR_Pct_PWM_Output DutyCycle] b) Diagnostic enabled c) Timer - Test Enable	a) >= 39.00 % b) == TRUE c) >= 2.00 seconds	250.00 failures / 300.00 samples 100 ms / sample	Type B, 2 Trips

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

Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle.
		Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature
			Depending on Combustion Mode
			
			case **StrongExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmllp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				< 0.5* **P054E_IFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					(
					CeFULR_e_InGear:
					transmission
					
					CeFULR_e_NeutralPark:
					transmission
					
					CeFULR_e_InGearNeutralPark:
					transmission
					)
					
					and
					engine speed
					
					and
					engine speed
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(550.00 , 550.00 + 0.00)[rpm]
						
						<hysteresis(1,560.00 , 1,560.00 + 0.00)[rpm]
							200.00 failures out of 255.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				temperature	and			
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	(OBD Coolant Enable Criteria	== TRUE		
					OR			
					engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
			}		)			
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
					and vehicle speed	< 3.00 [kph]		
			{ <u>transmission in Gear:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleHCG** [mm^3] depending on engine speed and engine coolant temperature	and enabled in the combustion mode	**P054E_IFM_CombModesEnbl**		
					and Accelerator Pedal Position	<= 0.05 [%]		
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and Engine running	**-**		
					and PTO_PTO_Active	== 0 [Boolean]		
					and Run Crank voltage	>=11.00 [V]		
			}		and if the transmission is manual			

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

			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				< 0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				< 0.5* **P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
					OR
					the clutch pedal position
					)
					NLT_Active
					
					and
					No active DTC's:
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECMNonVICM:
					
					default:
					)
						> 0.00
						
						< 0.00
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						NLT_ActvErr
						
						(FUL_GenericInjSysFA
						AND
						FUL_GenericInjSysFlt
						)		

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

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				> 1.5* **P054F_IFM_MaxFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant temperature
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					{
					CeFULR_e_InGear:
					transmission
					
					CeFULR_e_NeutralPark:
					transmission
					
					CeFULR_e_InGearNeutralPark:
					transmission
					}
					
					and
					engine speed
					
					and
					engine speed
					
					and
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(550.00 , 550.00 + 0.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 0.00) [rpm]
							200.00 failures out of 255.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

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

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS DeHC Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			default:
				> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature
					{
					OBD Coolant Enable Criteria
					
					OR
					engine coolant temperature
					
					}
					
					and
					outside air temperature
					
					and
					vehicle speed
					
					and
					enabled in the combustion mode
					
					and
					Accelerator Pedal Position
					
					and
					Engine running
					
					and
					PTO_PTO_Active
					
					and
					Run Crank voltage
					
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<= 0.05 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]
						
						>0.00		

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

			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				> 1.5* **P054F_IFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					OR
					
					the clutch pedal position
					)
					
					NLT_Active
					
					and
					No active DTC's:
					
					Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						<0.00
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensorTFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						NLT_ActvErr
						
						(FUL_GenericInjSysFA AND FUL_GenericInjSysFlt
						)		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	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	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	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	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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid.	If x of y rolling count/ protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message Message rollling countoprevious message rolling count value plus one	Cruise Control Switch Serial Data Error Diagnostic Enable Serial communication to BCM Power Mode Engine Running	1.00 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 , Emissions Neutral Diagnostics - special type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	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 theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 250.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.33 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 8.00 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 **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	15.00	Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	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 considerred to be "open short to ground when the ratio is measured in the following rangs: 0-0.185	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit	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	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position. Retry attempts will continue until the commanded position is achieved or the trip ends.	[Smart Shutter Actuator 1 Position Response **OR** Shutters Not Initialized **OR** The absolute difference between Smart Shutter Actuator 1 Position Response and Shutter response and Commanded Position percent] **AND** Shutter 1 Diagnostic Delay Threshold count	[Indeterminate **OR** = TRUE **OR** > 5.00] **AND** Counter > 109.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be enabled even in the	a. = TRUE b. = Enabled c. = TRUE d. = TRUE e. = FALSE f. = TRUE g. = TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND<= 32.00 j. = TRUE k. = Disabled	0.1 seconds out of a 0.1 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028400, U058500) m. No LIN communication Fault Pending n. LIN communication Data is Ready	l. = TRUE m. =TRUE n. = TRUE		
			Shutter 1 Performance Test count	= 5.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off	a. = TRUE b. = Enabled c. = TRUE d. = TRUE e. = FALSE f. = TRUE	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be enabled even in the presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028400, U058500) m. No LIN communication Fault Pending n. LIN communication Data is Ready	g. = TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND <=32.00 j. = TRUE k. = Disabled l. = TRUE m. =TRUE n. = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter B Performance /Stuck OFF	P05AE	A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position. Retry attempts will continue until the commanded position is achieved or the trip ends. Retry attempts will continue until the commanded position is achieved or the trip ends.	[Smart Shutter Actuator 2 Position Response **OR** Shutters Not Initialized **OR** The absolute difference between Smart Shutter Actuator 2 Position Response and Shutter response and Commanded Position percent] **AND** Shutter 2 Diagnostic Delay Threshold count	[Indeterminate **OR** = TRUE **OR** >5.00] **AND** Counter > 109.00 counts	a. Command Shutter2 Enable. b. Shutter2 Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be	a. = TRUE b. = Enabled c. = TRUE d. = TRUE e. = FALSE f. = TRUE g. = TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND <=32.00 j. = TRUE k. = Disabled	0.1 seconds out of a 0.1 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled even in the presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028500, U058600) m. No LIN communication Fault Pending n. LIN communication Data is Ready	l. = TRUE m. =TRUE n. = TRUE		
			Shutter 2 Performance Test count	= 5.00 counts	a. Command Shutter2 Enable. b. Shutter2 Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off	a. = TRUE b. = Enabled c. = TRUE d. = TRUE e. = FALSE f. = TRUE	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g. ECU Awake	g. = TRUE		
					h. Run Crank Voltage in Range	h. >=11.00 AND <= 32.00		
					i. Ignition Powertrain Relay Voltage in Range	i. >= 11.00 AND <=32.00		
					j. Actuator Initialization Complete	j. = TRUE		
					Any of the following conditions are met			
					k. If Enabled, performance diagnostics will be enabled even in the presence of a communication fault.	k. = Disabled		
					All of the following conditions are met:			
					l. LIN communication NOT faulted.(DTC: U028500, U058600)	l. = TRUE		
					m. No LIN communication Fault Pending	m. =TRUE		
					n. LIN communication Data is Ready	n. = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Injection Timing Performance	P05EC	This DTC detects an injection timing only fault by comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW in cold start condition.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR > 4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 3,000.00 == TRUE; - -	280.00 failures out of 400.00 samples 1 sample every engine revolution	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start strategy enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	3			Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47500 s			When dual store updates occur.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	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 recieved	Run/Crank voltage Run/Crank voltage	>=6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159/399 counts intermittent or 39 counts continuous; 39 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 recieved			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	360.000 seconds	
			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 orocessor's			Test is Enabled: 1	12.5 to 25 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			configuration register masks versus known good data			(If 0, this test is disabled)		
			Checks number of stack over/under flow since last powerup reset >=	3		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 occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							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: **P0606.PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606.PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main 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: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance (Diesel)	P060C	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.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 2,500.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 2,500.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			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	
			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 463 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			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	255/6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor is out of bounds given by threshold	N/A	Ignition State	Accessory, run or crank Transfer case range valid	7.00/ 10.00 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			range Transfer case neutral request from four wheel drive logic does not match with operating conditions			and not over-ridden FWD Apps only		
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Minimum value **P060C_Speed Control External Load f(Oil Temp, (RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) +** **P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				180.00 Nm				
			Engine Predicted Request Without Motor 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 multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	179.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Predicted Engine 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, down time multipier0.5	
			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 multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	180.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 163 ms continuous, 0.5 down time multipier	
			Engine Speed Lores	N/A		Engine speed greater	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Intake Firing timing (event based) calculation not equal its redundant calculation			than Orpm	163 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Minimum value (**P060C_Speed Control External Load f(Oil Temp, RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) + P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 180.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Minimum value (**P060C_Speed Control External Load f(Oil Temp, RPM)** ,	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P060C_Speed Control External Load Max f(Vehicle Speed, RPM) + P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)) + 180.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate	2,500.00	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	Nm			475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	93.75 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Desired engine torque request greater than redundant calculation plus threshold	179.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	550.50 m/s	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 163 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Speed Control's Preditcted 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 multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 213 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 180.00 Nm Low Threshold -180.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 35.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 180.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Torque Closed Loop Fuel Quantity Correction higher then threshold OR	9.16 mm3	Engine cranking or engine running		Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Torque Closed Loop Fuel Quantity Correction lower then threshold	- 9.16 mm3				
			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 exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1. 179.00 Nm 2. N/A 3. 179.00 Nm 4. 179.00 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 180.00 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity	0.00	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			is greater than threshold	Nm			175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	93.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			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 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions	1. 3.50 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	2,500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	3,750.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			AC friction torque is areaterthan commanded	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2.048	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			by AC control software				ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16/32 counts; 25.0msec/count	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Requested fuel mass is greater or equal to its redundant calculation plus threshold	15.52 mg	Engine running No rich combustion mode No cranking phase		Up/down timer 462.50 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fuel cut off request		multiplier	
			Engine friction torque is greater than its redundant calculation plus threshold OR Engine friction torque is lower than its redundant calculation minus threshold	180.00 Nm 180.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold OR High Pressure Pump Torque Load is lower than threshold	180.00 Nm 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	180.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	180.00 Nm -180.00 Nm	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Fuel volume request greater than its redundant calculation plus threshold	18.31 mm3	Engine running No rich combustion mode		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the sum of the Fuel Volumes in the pulse train minus Fuel Volume Request minus Main Correction greater than threshold	18.31 mm3	Engine Running No rich combustion mode Main pulse quantity already compensated with main correction is greater than or equal to zero		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cumulative Programmed Energizing Time greater then its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	194.98 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	194.98 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine Running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal higher than threshold OR Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal lower than threshold	300.00 MPa -40.00 MPa	Engine running Delta Filtered Pressure value lower than AND Delta Filtered Pressure value greater than	1,880.25 MPa/s -3,582.25 MPa/s	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute difference between Main Correction and its redundant calculation greater than or equal to threshold	18.31 mm3	Engine running No rich combustion mode		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than its redundant calculation plus threshold OR (only if cylinder balancing detected a fault) Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than threshold	**P060C_CB safety deadband threshold f (Fuel Rail Pressure)** us **P060C_CB safety deadband threshold f (Fuel Rail Pressure)** us	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA	**P060C_EIA safety deadband threshold f (Fuel Rail Pressure)**	Engine cranking or engine running		Up/down timer 162.50 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			compensation and its redundant calculation greater than threshold	us			0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	18.31 mm3	Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the weighted delta energizing time greater then threshold	**P060C_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero OR Oil Pump Low Pressure Offset Friction lower then threshold	-3.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Rate of change on fuel mass compensaton for coolant temperature greater than P2D2 threshold	77.59 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for air temperature greater then threshold	7.76 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute value of fuel mass compensated for vehicle speed greater than threshold	7.76 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of Main correction compensation based on coolant temperature greater then threshold	9.16 mm3	Engine Running No rich combustion mode		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Rail Pressure Wave Compensation greater than threshold	**P060C_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)** MPa	Engine cranking or running		Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	
			Injector Valve Closing Adjustment energizing time correction greater then threshold OR Injector Valve Closing Adjustment energizing time correction lower then threshold	**P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)** us **P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)** us	Engine Cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	180.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Fuel Temperature Energizing Time Compensation greater then its redundant calculation plus threshold	**P060C_FTD safety deadband threshold f (Fuel Rail Pressure)** us	(Engine running OR engine cranking occurred in current driving cycle)		Up/down timer 87.50 ms continuous, 0.5 down time multiplier	
					AND			
					FULJnjLeakTempValid	= TRUE		
			Absolute value of the diffence between current and previous Fuel Injector Backflow Temperature greater then threshold	2,047.94 °C/100ms	Engine cranking or engine running		Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	
					ECT_Sensor_FA	= FALSE		
					AND			
					FTS_FTS_CktFA	= FALSE		
					AND			
					FTS_FTS_PIFA	= FALSE		
					AND			
					XOY_SecurityFlt_CeXOYR_e_FULR_FTD_RateLimFlt	= FALSE		
					AND			
					XOY_SecurityFlt_CeXOYR_e_ETMR_FTD_RedntCalcFlt	= FALSE		
			Increase of pumping losses due to exhaust brake actuation less then threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							down time multiplier	
			Exhaust Brake Torque Capacity less then Threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Delta Engine Fuel Temperature less than zero		Engine Fuel Temperature below threshold Engine cranking or engine running	80.00° C	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Previous Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode		Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			The sum of Low, Middle		Engine cranking or engine		Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and High Barometric Correction Factors greater than 1		running		462.50 ms continuous, 0.5 down time multiplier	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter -SPI error (SPI communication failed)	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 40.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 11.00 [V] - - 40.00 [V]	4 failures out of 8 samples 12.5 ms / sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injector Driver Circuit Performance Bank 1	P062D	This DTC detects if there is: open circuit of the power supply line of the injector or Boost voltage fault or ECU internal fault The monitoring determines if the boost voltage is above a threshold or below another threshlod with hysteresis	Internal ECU Boost Voltage	> 58.00 [V] OR < hysteresis(40.00 , 41.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	14 failures out of 20 samples 6.25 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vrefl < or ECM percent Vrefl > or the difference between ECM filtered percent Vrefl and percent Vrefl >	4.875 % Vrefl 5.125% Vrefl 0.0495 % Vrefl	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #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 = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	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.	Short to power: < 0.5 Ω impedance between output and controller power	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <=5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 commanded “OFF” No active DTCs:	>=2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit Low Voltage (Output Driver Monitor)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: < 0.5 Q impedance between signal and controller ground	Powertrain Relay Voltage	Voltage > 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: < 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage > 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < 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 = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBCM is valid	Serial Communication 2's complement message - ($1C7/$1C9 for engine torque, $1CA/$1C6for axle torque) OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period Torque request greater than torque request diagnostic maximum threshold	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one Requested torque intervention type toggles from not increasing request to increasing request > 250 Nm for engine torque based traction torque system, OR > 4,000 Nm for axle torque based traction torque system	Serial communication to EBCM Power Mode Engine Running Status of traction in GMLAN message ($4E9) Run/Crank Active Ignition Voltage	No loss of communication = Run = True = Traction Present > 0.50 seconds > 6.41 volts	>= 6 failures out of 10 Performed on every received message 6 rolling count failures out of 10 samples Performed on every received message >= 3 multi-transitions out of 5 samples. Performed every 200 ms >= 6 out of 10 samples Performed on every received message	Type C, No SVS Emissions Neutral Diagnostic - Type C

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Alive Rolling Count or Protection Value from the FPDCM over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Driver Control Module over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 100ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Boost Control Signal Message Counter Incorrect	P100A	This DTC monitors for an error in communication with the Turbocharger Boost Control Signal	Communication of the Turbo Actuator Error Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Status Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Learned Relative Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for out of total samples or Communication of the Turbo Actuator Actual Position Alive Rolling Count or Protection Value	>= 8.00 counts >= 10.00 counts >=8.00 counts >= 10.00 counts >=8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On	Executes in 10ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			from the VGTA over CAN bus is incorrect for	 >= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Supply Voltage Count or Protection Value from the VGTA over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Temperature Unprocessed Value Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			or					
			Communication of the Turbo Actuator Learned Absolute Position Alive Rolling Count or Protection Value from the VGTA over CAN bus is incorrect for	>= 8.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			out of total samples	>= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Open	P1029	This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"] The diagnostic can detect open circuit faults when the fuel pump is not rotating. In the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. This process is completed in less than 1 millisecond. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPresSysType c) Diagnostic Enabled - KeFABR_b OpenCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_lnfo7_ARCChkErr]	a) == 0 RPM b) CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Low	P102A	This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground] 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	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_GshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_lnfo7_ARCChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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]. 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. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType c) Diagnostic KeFABR_b GshtCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARCChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit High	P102B	This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery] 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	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARCChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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]. 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. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage	V[backEMF] > 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR_b PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARCChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Quantity Monitoring	P1037	This monitor detects failures in the application of the correct coolant compensations to fuel injection system setpoint during cold start. The injection system diagnostic monitors that energizing time programmed by the SW for each injection pulse (that is the fuel quantity) is correctly driven by the ECU (ET width and sequence for each stroke and for each cylinder are checked). This monitor detects	In order to identify whether there is a fault on an injector, the following tests shall be performed: 1. At least one dropped pulse is present (i.e. at least one pulse programmed by the application software is not driven by the ECU) 2. |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyi)I where: ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX and on cylinder cyl ETpulseX,programmed (cyl) = ETpulseX,SW (cyl) + EOIpulseX,HWIO (cyl) = energizing time programmed by SW for pulseX and on cylinder cyl (end of injection is not included) + end of injection feedback read by HWIO for pulseX and on cylinder cyl	> 50.00	Test enabled by calibration Powertrain relay voltage in range Engine is running Catalyst Warm-Up Boolean from CSERS should be enabled (it takes into account the combustion mode, the minimum soaking time and ECT limit) CSE_CatalystWarmupEnabled No monitoring Shutoff conditions present (no FA on Boost Voltage monitoring, Injector Electrical monitorings, Pull In Period monitoring, and Controller Status monitoring) FUL_BoostVoltFA FUL_FuelInjCkt_FA FUL_PullInErrFA FUL_CntrlrStFA At least one injection	== 1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] == TRUE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == TRUE [Boolean]	50.00 failures of 100.00 samples Function task: angular based	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					pulse is requested by the application SW FUL_FuelInjected			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit Low Bank 1 Unit 1	P1048	This diagnosis verifies if a DEF dosing valve high side short to ground occurred	HWIO interface DEFMV_ENABLE_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit High Bank 1 Unit 1	P1049	This diagnosis verifies if a DEF dosing valve high side short to power occurred	HWIO interface DEFMV_ENABLE_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the temperature of DEF injector coil and compares to reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	>55.00	Test enabled by calibration (TRUE->Enable False -> Disable)	1.00	Single decision criteria. Function Task: 25ms	Type B, 2 Trips
					DEF Injector Fault State (No fault on injector)	== FALSE		
					Powertrain relay in range	== TRUE		
					Long Engine off soak period has elapsed (sec)	>= 28,800.00		
					Service Test	== FALSE		
					Run/Crank is Active	== TRUE		
					Engine in Cranking Phase	== FALSE		
					Powertrain Relay in-Range	== TRUE		
					Diag System Disable	== FALSE		
					Coil Temp Rationality Diag Inhibited	== FALSE		
					Coil Temperature Estimation Available	== TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Fuel Level Sensor 2 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	**Sensor usage definitions:** **Sensori =** CeECTR_e_ECT_Snsr (Sensori is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_IAT_Snsr **Sensor3 =** CeECTR_e_OAT_Snsr		No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type A, 1 Trips
					Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization	>28,800 seconds >25,200 seconds = Not occurred		
			A failure will be reported if any of the following occur: 1) Sensori power up absolute temp difference to Sensor2 and Sensor3 is (Sensori fast fail) .	> 50.0 °C	Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag	= False = False = False > -20 °C = False		
			2) Sensori power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected)	> 20.0 and < 50.0 °C	Block Heater detection is **enabled** when either of the following occurs: 1) Sensori power up temp is greater than Sensor2 and Sensor3 in this range:	>20.0 °C and <50.0 °C		
			3) Sensori power up temp is lower than Sensor2 and Sensor3 by this amount:	< 20.0 Deg °C	2) Cranking time	< 120.0 Seconds		
			4) Sensori power up temp is > Sensor2 and					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Sensor3 by 20.0 °C and the time spent cranking the engine without starting is > 120.0 seconds with the LowFuelConditionDiag	= False	Block Heater is **detected** and diagnostic is aborted when 1) or 2) occurs.			
					Ia) IAT monitoring is enabled after the following Vehicle drive constraints			
					Ib) Drive time	> 400 Seconds with		
					Ic) Vehicle speed	> 14.9 MPH and		
					Id) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows:	0.50 times the seconds with vehicle speed below 1b		
					Ie) IAT drops from power up IAT	> 8.0 °C		
					2a) ECT monitoring is enabled after engine start in the following engine run time window	5.0 <= seconds <= 40.0		
					2b) Sensori temp derivative during the test is:	< -0.10°C/sec		
					2c) Consecutive samples of 2b) being true are:	> 4 samples		
					Diagnostic is **aborted** when 3) or 4) occurs:			
					3) Engine run time with vehicle speed below 1b	> 1,800 Seconds		
					4) Engine off time (i.e. auto stop) during Block heater detection	>300.0 Seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit	P115E	This diagnosis verifies Upstream NOx gen3 sensor 02 binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Upstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit	P116A	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Linear pin (P-)	open circuit on P- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit Low Voltage	P116B	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit High Voltage	P116C	This diagnosis verifies Upstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Linear pin (P-)	powershort on P- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit	P116D	This diagnosis verifies Upstream NOx gen3 sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Reference pin(M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Upstream NOx gen3 sensor 02 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Upstream NOx gen3 sensor 02 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module 5V Reference 2 Circuit	P1177	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 2 Circuit	Raw Fuel Pump Driver Control Module 5V Reference 2 is 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 > 99.00 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1178	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is 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 > 99.00 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Level Sensor 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 <87.75 Percent > 99.00 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit	P1192	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Upstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit	P119A	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit High Voltage	P119C	This diagnosis verifies Upstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Downstream NOx gen3 sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit	P11BE	This diagnosis verifies Dowstream NOx gen3 sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Binary reference voltage (P+ pin)	open circuit on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:P30B5	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Binary reference voltage (P+ pin)	groundshort on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit High Voltage	P11C0	This diagnosis verifies Downstream NOx gen3 sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 02 Binary reference voltage (P+ pin)	powershort on P+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					P30B5No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit	P11C5	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Upstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Downstream NOx gen3 sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Dowmstream NOx gen3 sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit	P11D0	This diagnosis verifies Dowstream NOx gen3 sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Linear pin (P-)	open circuit on P-	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Linear pin (P-)	groundshort on P- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit High Voltage	P11D2	This diagnosis verifies Downstream NOx gen3 sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 02 Linear Pin (P-)	powershort on P- pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Upstream NOx sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx sensor readings (where every reading is the mean value of a sampling window)	< -19.00 ppm > 79.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Upstream NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE >11.00V TRUE TRUE < 0.03 % > - 0.03 % > 10.00 sec > 9.90 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00% < 400.00 g/s > 0.00 g/s < 700.00 mg/s > -1.00 mg/s < 4,500.00 rpm	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 205.00 g and Upstream NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 5.00 sampling windows (each one made up of 5.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range	> 550.00 rpm		
					Upstream NOx sensor temperature is within a range	< 325.00 °C > -7.00 °C		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 20.00 mm ^3/s < 0.00 mm ^3 > -1.00 mm^3 > 1.00 s		
					Intake manifold absolute pressure	< 1,000-00 kPa		
					No failure on intake manifold absolute pressure sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 sensor	NOX_NOx1_OutOfRngLo Fit ==FALSE		
					No out of range high failure on NOx1 sensor	NOX_NOx1_OutOfRngHi Fit ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostCo mm_F ltN_B u sB_NOxSnsr_A ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHPJnjLeakageFA ==FALSE		
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					No failure on Upstream SCR temperature sensor	NOX_Snsr1_TempFlt ==FALSE		
					No DTC set:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2 - L5P only	P11D5	This diagnosis verifies if Downstream NOx sensor raw signal is affected by an offset	Check if NOx2 signal has an offset by learning the raw value in stable conditions during afterrun maneuver. The diagnosis result is the average value of a sampling window. The diagnosis result is processed with EWMA logic. A fault is detected if one of the following conditions is true: 1. EWMA filtered NOx raw average value OR 2. EWMA filtered NOx raw average value	 < -30 ppm > 43 ppm	No failure on upstream SCR temperature Sensor No failure on Vehicle Speed Sensor No failure on SCR system No failure on HC injector No failure on NOx Sensor Bus relay circuit No failure on downstream SCR HC model inputs No 02 plausibility in load fault on NOx2 No failure on crank Sensor No failure on NOx2 CAN communication No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor	EGT_TempSCR_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBRJRIyFA ==FALSE SCR_HC_SCR_DwnFlt ==FALSE OXY_NOx2ChkLoadFlt ==FALSE CrankSensor_FA == FALSE CrankSensor_TFTKO == FALSE CAN_LostComm_F1N_BusB_NOxSnsr_B ==FALSE N0X_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFit ==FALSE N0X_N0x2_0ut0fRngHiFit ==FALSE	The monitor runs in afterrun, at 150 s after keyoff, once P22FE diagnostic has been completed. The NOx value used for the monitor is calculated by sampling up to 100 samples. Once computed this value, the diagnostic provides a result. Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 test per trip are allowed Task = 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No current control failure on NOx2 Sensor	NOX_NOx2_StBitChkFlt ==FALSE		
					No DTC active:	P30B5		
					Powertrain relay voltage	> 11.00V		
					Sensor heater is in range:			
					a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 0.03 % > - 0.03 %		
					b) condition a) is fulfilled for time	> 45.00 s		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					c) Sensor signal status is valid	TRUE		
					d) condition c) is fulfilled for time	> 5 s		
					Post Catalyst NOx Sensor is present in the exhaust	TRUE		
					Engine is not cranking	TRUE		
					e) combustion mode dependent enabling flag	**NOX_S2_OfstMntrEnblCmbMode**		
					f) condition e) is fulfilled for time	> 15 s		
					g) engine speed	> Orpm < 4.000 rom		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					h) condition g) is fulfilled for time	> 1 s		
					i) After injection pulse is not used for time	> Os		
					j) upstream SCR temperature	> 180 °C < 300 °C		
					k) exhaust mass flow is in range	> Og/s < 400 g/s		
					l) DEF injection is in range	>= Omg/s < 350mg/s		
					m) conditions j) k) 1) are fulfilled for time	> 60s		
					n) duty cycle applied to the HC injector driver	< 100%		
					o) condition n) is fulfilled for time	> 0s		
					p) time between key off and last regen event	> 300 s		
					q) deceleration before keyoff	< 2.50m/s^2		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled			
					s.1) vehicle speed in idle range	< 5kph < 10kph		
					s.2) condition s.1) fulfilled for time	> 1 s		
					t) idle before kevoff for a	< 450 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					time			
					u) Upstream SCR temperatures derivative in range	< 9.0 °C/s		
					v) condition u) is fulfilled for a time	> Os		
					w) upstream SCR temperature derivative overcomes threshold	< 9.0 °C/s		
					x) condition w) has expired for a time	> 120s		
					timers of conditions v), x) are reset when condition w) is verified			
					y) time between keyoff and last DEF RDP event	> 60s		
					z) DEF system ready to inject	TRUE		
					A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well:			
					A1) alpha ratio	> 10.00		
					B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off	> 180s		
					Once all conditions above are fulfilled durina the			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					driving cycle, sensor raw signal average in a calibratable window is computed in afterrun when following conditions are fulfilled: C) stabilization timer to trigger execution D) P22FE execution has been completed	 > 150s TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit	P11D8	This diagnosis verifies Downstream NOx gen3 sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Downstream NOx gen3 sensor 02 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit High Voltage	P11DA	This diagnosis verifies Downstream NOx gen3 sensor 02 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit	P11FC	This diagnosis verifies Dowstream NOx gen3 sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Downstream NOx gen3 sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Command Signal Message Counter Incorrect	P11FF	This DTC monitors for an error in communication with the Fuel Pump Command Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for	>= 15 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
			out of total samples	>= 16 counts	All the following conditions are met for	>= 3,000.00 milliseconds		
					Power Mode	= Run		
					Powertrain Relay Voltage	>=11.00 Volts		
					Run/Crank Ignition Voltage	>=11.00 Volts		
					And			
					Sensor Bus Relay	= On (if present)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Fuel Level Sensor 1 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Positive Voltage Control Circuit Shorted to Control Circuit	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Positive Voltage Control Circuit Shorted to Control Circuit	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Positive Voltage Control Circuit Shorted to Control Circuit	P124E	This DTC detects a shorted load on Injector 7	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 8 Positive Voltage Control Circuit Shorted to Control Circuit	P124F	This DTC detects a shorted load on Injector 8	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 OvertempDiagEnbl] 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_ARCChkErr]	a) ==TRUE b) == TRUE c) == TRUE d) <> TRUE	5.00 failures / 10.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit Low Voltage	P127C	Determine when a short circuit to ground affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.3 %	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage Rail PRessure Sensor configuration calibrated as *Double Track*	 >15 s > 8.4 V	38 failures out of 55 samples OR 22 continuous failures out of 55 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit High Voltage	P127D	Determine when a short circuit to voltage affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 94.8%	Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage Rail PRessure Sensor configuration calibrated as *Double Track*	 >15 s > 8.4 V	38 failures out of 76 samples OR 22 continuous failures out of 76 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> Speed Error Low Threshold [Supporting Table] **P129F Threshold Low** OR < Speed Error High Threshold [Supporting Table] **P129F Threshold High**	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_ARCChkErr] 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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance diagnostic is to detect if the state of the fuel control enable circuit is valid. This is done by comparing the fuel control enable circuit state [high or low] sensed by the Fuel 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_FuelCntrlEnblDiagEnbl] b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b FTZM Info2 A RCChkErr] c) CAN Sensor Bus message $OCC_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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Run/ Start Voltage Signal Message Counter Incorrect	P130F	This DTC monitors for an error in the Ignition Run/Start Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM)over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Control Module Diagnostic Status Signal 1 Message Counter Incorrect	P139A	This DTC monitors for an error in communication with the Glow Plug Control Module Diagnostic Status 1 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: Glow Plug Control Module Diagnostic Status 1 ARC	 >=8.00 counts out of >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Control Module Diagnostic Status Signal 2 Message Counter Incorrect	P139B	This DTC monitors for an error in communication with the Glow Plug Control Module Diagnostic Status 2 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: Glow Plug Control Module Diagnostic Status 2 ARC	 >=8.00 counts out of >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing EGR slow response threshold** **[%]**	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one OBD Coolant Enable Criteria Throttle measured position	P140B, P140C: EGR slow response enabling == TRUE (see FreeForm) ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form >0.10[s] > 0 [%] ==TRUE ==TRUE > 85.00 [%]	Test is evaluated after the enabling conditions are satisfied for a number of samples >=250.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Outside air temperature	>-12.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					Engine speed in range	>1,100.00 [rpm] AND <2,000.00 [rpm]		
					Desired fuel quantity in range	> 25.00 [mm^3] AND < 50.00 [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND <350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	>-30.00 [mg/s] AND <-10.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	< 0 [mg]		
					EGR valve position OR it is above that threshold for a time	<= 55.00 [%] >=100.00 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Nominal EGR valve total flow is valid	EGR_VlvTotFlowNomNotVid ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the EGR system that lead to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding EGR valves, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the EGR flow response time.	Error difference (absolute value) between the desired EGR rate and the actual EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing EGR slow response threshold** **[%]**	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one OBD Coolant Enable Criteria Throttle measured position	P140B, P140C: EGR slow response enabling == TRUE (see FreeForm) ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form >0.10[s] > 0 [%] ==TRUE ==TRUE > 85.00 [%]	Test is evaluated after the enabling conditions are satisfied for a number of samples >=250.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Outside air temperature	>-12.00 [°C]		
					Ambient air pressure	>69.60 [kPa]		
					Engine speed in range	>1,200.00 [rpm] AND < 1,600.00 [rpm]		
					Desired fuel quantity in range	> 50.00 [mm^3] AND < 120.00 [mm^3]		
					Exhaust manifold pressure in range	>70.00 [kPa] AND < 350.00 [kPa]		
					Desired air request is steady state: AirReq-AirReqOld	>2.00 [mg/s] AND <40.00 [mg/s]		
					Air control tracking error (air setpoint-MAF measure)	> 0 [mg]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 RefV Period]	> 25.00 millisec	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 millisec	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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control System Diagnostic Signals Message Counter Incorrect	P143A	This DTC monitors for an error in communication with the Reductant Control System Diagnostic Signals	Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Diagnostic Information 1 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Diagnostic Controller Information 2 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Diagnostic Information 3 over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control System Information Signals Message Counter Incorrect	P143B	This DTC monitors for an error in communication with the Reductant Control System Information Signals	Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Reductant Sensor Data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Information 1 over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Diesel Exhaust Fluid Controller Information 2 over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >=8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 10ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Electric Water Pump Status Message Counter Incorrect	P14A0	This DTC monitors for an internal error or error in communication with the Charge Air Cooler Electric Water Pump Status Message Counter.	Communication of the Alive Rolling Count from the Charge Air Cooler Electric Water Pump over LIN bus is incorrect for out of total samples	 >=8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request signal in$19D	Communication of the Alive Rolling Count or Protection Value in the Transmission Engine Speed signal over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Communication of the Alive Rolling Count from the Shutter Module A over LIN bus is incorrect or the Shutter Module A signals has an internal error for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Communication Error with Active Grill Air Shutter Module "B"	P151F	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module B	Communication of the Alive Rolling Count from the Shutter Module B over LIN bus is incorrect or the Shutter Module B signals has an internal error for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 0.5 seconds			fail continuously for greater than 0.5 seconds	Type C, No SVS , Emissions Neutral Diagnostics - special type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	This DTC checks that the Sensor Bus Relay output is not stuck high	The Sensor Bus Relay ouput is stuck high	>= KeSBRR_Cnt_SB_RlyStkHiFailThrsh within KeSBRR_Cnt_SB_RlyStkHiSmplThrsh samples	The Sensor Bus Relay output has been inactive	>= KeSBRR_t_SB_RelayCommandedOff		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Calibration Incorrect	P158A	Type of cruise in Body Control Module does not match that in the Engine Control Module for 2.5 seconds	Type of cruise system in GMLAN $4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	DID $40 from BCM says cruise system is present (ECM recieves programmble 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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Pressure Regulator 1 Control Performance	P163A	Determine when commanded current for Fuel metering Unit valve is out of expected current range.	Current flowing through fuel metering unit valve OR Current flowing through fuel metering unit valve	>2.80 A <0.05 A	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)* No active DTC since key is on:	> 11.0V FHP_MU_DrvrCloseTFTK 0 FHP_MU_DrvrOpenTFTK 0	160 failures out of 250 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Pressure Regulator 2 Control Performance	P163B	Determine when commanded current for Rail Pressure Regulator valve is out of expected current range.	Current flowing through pressure regulator valve OR Current flowing through pressure regulator valve	>2.80 A <0.05 A	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl)* No active DTC since key is on:	> 11.0V FHP_PR_DrvrCloseTFTKO FHP_PR_DrvrOpenTFTKO	160 failures out of 250 samples 6.25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Reference Voltage Status Message Counter Incorrect	P165C	This DTC monitors for an error in communication with the Sensor Reference Voltage Status Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)** 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank - PT Relay Ignition) >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** 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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit 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.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K Q ohms impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controlle rs P16D8 may also set (Sensor Bus Relay Control Circuit Low).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit Low	P16D8	Detects a short to ground in the sensor bus relay circuit. This diagnostic reports the DTC when a short to ground is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: < 0.5 Q impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D7 may also set (Sensor Bus Relay Control Circuit Open).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit High	P16D9	Detects a short to power in the sensor bus relay circuit. This diagnostic reports the DTC when a short to power is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	>6.41 Volts	39/ 399 counts continuous; 12.5 ms /count in the ECM 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	159 / 399 counts continuous; 12.5 ms /count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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_StartStopConv. (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 < 318.14MPH > 5.0 seconds <>CeINFR_e_StartStopConv	>3 error counts for> 10.0 seconds 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd high or low command incorrect	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is neutral, while the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.Monitor measures transfer caes gear ratio is not 4wd high ratio nor 4wd low ratio while the transfer case control module command state is either 4wd high or 4wd low.	Measured transfer case ratio is not in Low window AND Measured transfer case ratio is not in High window	4WD low ratio window <=2.85 >=2.50 4WD high ratio window <=1.20 >=0.80	Transfer case range command Incorrect range diagnostic enable calibration Engine torque Ignition voltage Battery voltage Engine speed Vehicle speed Transmission selected gear AND	# 4WD neutral = TRUE >= -20.00 Nm AND <= 1,000.00 Nm >= 9.00 V for >= 5.00 seconds >= 9.00 V for >= 5.00 seconds >= 700.00 RPM for >= 5.00 seconds >= 5.00 KM/H for >= 5.00 seconds Reverse or Drive (1st gear through 10th gear)	Fail count > 280.00 Out of sample count > 400.00 Update rate 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diagnostic enable for currently selected transmission gear (Reverse, 1st through 10th gear, individually calibrated)	= TRUE		
					Transmission shift in progress	= No shift in progress for >= 5.00		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	= Inactive = TRUE		
					Transfer case range	= Prevous transfer case range for >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C for >= 5.00 seconds		
					Run crank active	= TRUE		
					Diagnostics system enabled calibration	= TRUE		
					PTO OR Ratio diagnostics in PTO enabled calibration	active = TRUE		
					DTCs not fault active	Transmission Turbine Angular Velocity Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Transmission Shift Lever Position Validity Transmission Output Shaft Angular Velocity Validity P0700		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Signal Message Counter Incorrect	P188B	This DTC monitors for an error in communication with the Transmission Range Signal	Communication of the Alive Rolling Count or Protection Value of the Transmission Range Signal over CAN bus is incorrect for out of total samples	 >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is avaialble >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 250ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Axle Torque Secondary Signal Message Counter Incorrect	P1899	This DTC monitors for an error in communication with the Axle Torque Secondary Signal	Communication of the Alive Rolling Count or Protection of the Axle Torque Secondary Signal over CAN bus is incorrect for	>= 15.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000.00 milliseconds		
					Power Mode	= Run		
			out of total samples	>= 16.00 counts	Powertrain Relay Voltage	>=11.00 Volts		
					Run/Crank Ignition Voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Four Wheel Drive Range Secondary Signal Message Counter Incorrect	P189A	This DTC monitors for an error in communication with the Secondary Axle Operational Mode Signal	Communication of the Alive Rolling Count or Protection of the Secondary Axle Operational Mode Signal over CAN bus is incorrect for out of total samples	>= 15.00 counts >= 16.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Neutral Locked Turbine Signal Message Counter Incorrect	P1919	This DTC monitors for an error in communication with the Transmission Neutral Locked Turbine Signal Message.	Communication of the Alive Rolling Count or Protection Value of the Transmission Neutral Locked Turbine Signal over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit / Open Bank 1 Unit 1	P2047	This diagnosis verifies if a DEF dosing valve open circuit occurred	HWIO interface DEFMVJDPEN = Fault	VeHWIO_e_DEFMV_ Open == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMVJDPEN different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit Low Bank 1 Unit 1	P2048	This diagnosis verifies if a DEF dosing valve low side short to ground occurred	HWIO interface DEFMV_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit High Bank 1 Unit 1	P2049	This diagnosis verifies if a DEF dosing valve low side short to battery occurred	HWIO interface DEFMV_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SCR NOx Catalyst Efficiency Below Threshold Bank 1 - EWMA Enabled	P20EE	The diagnosis checks if there is a malfunction in the SCR NOx conversion system measuring its SCR NOx conversion efficiency. SCR NOx conversion efficiency is evaluated by two NOx sensors (upstream & downstream SCR). The monitoring is executed by comparing measured NOx conversion efficiency and reference efficiency: - Measured NOx conversion efficiency is calculated as q_Eff_Msrd = 1 - [J NOx_Dwn_Msrd / J NOxUpMsrd] - Reference efficiency is evaluated as q Eff Ref = 1 - [J NOx_Dwn_Ref / J NOxUpMsrd] NOx_Dwn_Ref is calsulated as	EWMA filtering is applied to the difference between measured SCR NOx conversion efficiency (r|_Eff_Msrd)) and reference efficiency (q_Eff_Ref). For the calculation of r|_Eff_Ref, a fixed value of SCR_eff_estimated equal to 1 is used if 1.00 == 1 [Boolean], Otherwise, the estimated efficiency provided by model (SCR_eff_estimated) is used.	Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time elapsed after SCR chemical model is healed; Debounce time elapsed after exiting from transient dosing forced by remedial action (conditions active only if Market # USA_CARB); Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR)	CalOut = 1 [Boolean]; # NOX_Snsr1_NOx_Flt ≠ NOX_NOx SnsrSCR DwnFlt # EGT_TempSCR_UpFlt # EGP_PresSCR_UpFlt # EXM_TurbFlowNotValid # SCR_RDP Fit # SCR_TipStuckFltSt # SCR_DEFMV_FA # SCR_ChemicalMdlFlt; Debounce = 120 [sec]; Debounce = 300 [sec]; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1;	One failure to set the DTC.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		NOx_Dwn_Ref = NOx_Up_Msrd * (1 - (SCR_eff_estimated - offset)) SCR_eff_estimated comes from SCR chemical model and it takes into account the estimated amount of NOx at SCR outlet: SCR_eff_estimated = 1 - (NOx_Dwn_Est/ NOx_Up_Msrd) The offset **(K_EffOffset)** is calibrated in order to detect a malfunction. Test is performed when either NOx integral upstream SCR reaches 4,400.00 [mg] or NOx integral downstream SCR reaches 1,050.00 [mg] whatever condition occurs first. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			state; Total tests executed in Fast Initial Response (FIR) state up to calibratable value; Tests per trip up to calibratable value when EWMA filter is in Rapid Response (RR) state; Total tests executed in Rapid Response (RR) state up to calibratable value; DEF system ready to inject; Urea inside the tank not frozen; Debounce time elapsed after DEF defrost has been completed; Engine torque request higher than calibration; Rate of change of estimated efficiency (from SCR catalyst model) less than or equal to a calibratable value; Debounce time elapsed when estimated efficiency stable condition becomes true;	 FIR tot tests < 2 ; RR test trip < 2 ; RR tot tests < 4 ; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [sec]; Torque >= 0 [Nm]; |Rate of change of estimated efficiency! <= 0 H Debounce = 3 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Upstream SCR NOx sensor measurement reliable;	Reliable = True [Boolean];		
					Downstream SCR NOx sensor measurement reliable;	Reliable = True [Boolean];		
					Slip detection reliable;	Slip reliable = True [Boolean];		
					Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR catalyst de-greened);	DPF Rgn Compt > 1 [-];		
					SCR service bay test not active;	Service Bay Test == ServNotRunning [Enumerative];		
					Debounce time elapsed after exiting from SCR service bay test;	Debounce = 300 [sec];		
					Outside ambient temperature higher than calibration with hysteresis;	OAT > -20 [°C]; -20 [°C] < hysteresis range < -20 [°C]		
					Ambient pressure higher than calibration with hysteresis;	Pressure > 70 [kPa]; 70 [kPa] < hysteresis range < 70 [kPa]		
					Urea dosing activation by SCR mean temperature condition;	SCR mean temperature > 200 [°C]; 190 [°C] < hysteresis range < 200 [°C]		
					Debounce time elapsed after urea dosing activation by SCR mean	Debounce = 5 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature becomes true;			
					Difference between SCR upstream and SCR downstream temperatures: - higher than first calibration curve (f[SCR mean temperature]) AND - lower than second calibration curve (f[SCR mean temperature]);	SCR up/down diff temperature > **T_MinTempGrad** [°C] Temperature < **T_MaxTempGrad** [°C];		
					Debounce time elapsed when difference between SCR upstream and SCR downstream temperature condition becomes in range;	Debounce = 0 [sec];		
					Exhaust mass flow and SCR average temperature within calibratable limits defined by 2 size table (f [exhaust mass flow, SCR average temperature]), enabled if table output is greater than calibration;	**K_EffExhFlowCond >** 1 [-];		
					Debounce time elapsed when exhaust mass flow and SCR average temperature conditions get within limits;	Debounce = 10 [sec];		
					SCR mean temperature time derivative within limits defined by	-20 < Delta temperature < 24 [°C/sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					maximum and minimum calibrations and debounce time elapsed based on following logic: - while SCR mean temperature time derivative is outside the limits, the system continuously evaluates the debounce time based on calibration curve (f[SCR mean temperature time derivative]) and records the maximum value; - instead when SCR mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;	Debounce = **t_DerTempDsblTmr** [sec];		
					Upstream SCR NOx flow measurement lower than calibration and debounce time elapsed based on following logic: - while SCR NOx flow measurement higher than calibration, the system continuously evaluates the NOx average flow; - instead when SCR NOx flow measurement gets lower than calibration, debounce time based on calibration curve (f[NOx average flow, time spent with NOx flow higher than calibration]) is evaluated and countdown starts until debounce time	NOx up flow < 400 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max debounce = 0 [sec];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					has been elapsed. Limitation on the debouce time is always applied;			
					Upstream SCR NOx flow measurement higher than calibration;	NOx up flow > 2 [mg/s];		
					Upstream SCR NOx sensor measurement higher than calibration;	NOx up > 50 [ppm];		
					Upstream SCR NOx sensor measurement lower than calibration;	NOx up < 900 [ppm];		
					Downstream SCR NOx sensor measurement higher than calibration;	NOx dwn > -111,111 [PPm];		
					Upstream SCR absolute NOx flow derivative lower than calibration;	Delta NOx up flow < 250 [mg/sec^2];		
					NO2/NOX ratio: - higher than first calibratable value AND - lower than second calibratable value;	NO2/NOx> -111,111 [-] NO2/NOx< 111,111 [-];		
					Debounce time elapsed when all NOx conditions (except upstream SCR NOx flow measurement lower than calibration) become true;	Debounce = 1 [sec];		
					Slip conditions: - debounce time elapsed when no slip is detected any more,	Debounce = 0 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR - when slip is active NOx upstream flow accumulated shall be greater than a calibration curve (f[SCR temperature]); DPF / DeHC combustion modes not active; Debounce time elapsed after exiting from DPF / DeHC combustion modes; NH3 storage deviation error: - higher than first calibration curve (f[SCR average temperature]) AND - lower than second calibration curve (f[SCR average temperature]); NH3 storage: - higher than first calibration curve (f[SCR average temperature]) AND - lower than second calibration curve (f[SCR average temperature]); Debounce time elapsed when NH3 storage	JNOxJJp > **m_SlipNOxIntglThrsh** [mg]; Cmb + DPF_HiO2 | DPF_LoO2 | DPF_EngPrtct_HiO2 | DPF_EngPrtct_LoO2 | DPF_PN | DPF_Richldle | DeHC_Drive | DeHCPark [Enumerative]; Debounce = 300 [sec]; NH3 deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 deviation < **m_NH3_StrgDevErrMaxThrsh** [g]; NH3 storage > **m_NH3_StrgMinThrsh** [g] NH3 storage < **m_NH3_StrgMaxThrsh** [g]; Debounce = 3 [seel:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					deviation error or NH3 storage condition becomes in range; SCR dosing in NH3 storage control or in intrusive NH3 storage control; Debounce time elapsed when switching to NH3 storage control or intrusive NH3 storage control; Diesel Exhaust Fluid quality measurement (concentration read by DEF quality sensor) higher than calibration with hysteresis (condition active only if DEF quality sensor is available);	Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 5 [sec]; DEF concentration > 30 [Pct]; 29 [Pct] < hysteresis range < 30 [Pct] DEFQS present= 1 [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref	< 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref >	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor.	APP2 percent Vref <	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 percent Vref >	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between APP1 displaced and APP2 displaced >	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 faulst 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) >	3.500 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 Low Voltage	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 High Voltage	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 Low Voltage	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage high across High Side Driver of bank 2 (injector 2 and 5) during On state indicates short to ground	impedence between HS pin of injector 2 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_0utEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 High Voltage	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage low across High side drive of bank 2 (injector 2 and 5) during off state indicates short to power	impedence between HS pin of injector 2 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 Low Voltage	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 High Voltage	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 4 Low Voltage	P2156	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage high across High Side Driver of bank 4 (injector 3 and 8) during On state indicates short to ground	impedence between HS pin of injector 3 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_0utEnblCyl_CiEPSR CylinderH OR FUL_OutEnblCyl_CiEPSR CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 4 High Voltage	P2157	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage low across High side drive of bank 4 (injector 3 and 8) during off state indicates short to power	impedence between HS pin of injector 3 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderH OR FUL_OutEnblCyl_CiEPSR CylinderD) and (FUL_FuelInjectedCyl_CiEPSR_CylinderH OR FUL_FuelInjectedCyl_CiEPSR CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	5 failures out of 10 samples 100 ms/sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects when the Intake Air Temperature (IAT) sensor and IAT2 sensor values do not correlate with each other. These two temperature sensors are both in the induction system, although they do have different sensor time constants and different positional relationships with components that produce heat. If these two temperature values differ by a large enough amount, the Intake Air Temperature 1 / 2 Correlation Diagnostic will fail. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2201	This diagnosis verifies that Upstream NOx sensor embedded current control circuit status is healthy	Check if the NOx1 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta IpO< 300 uA/10 msec c) Delta Ip1 z 2.4 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx1 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time No DTC set:	>11.00V TRUE FALSE > 9.90 V TRUE TRUE < 0.03 % >- 0.03% > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec P30B4	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 1	P2202	This diagnosis verifies Upstream NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag No DTC active:	>-1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A > 9.90 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode** P30B4	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Upstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range:		Powertrain relay voltage	>11.00V	Time counter: 200 fails out of 250 samples	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	>2,500 ppm	No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A	Task=25ms	
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_ElecFA ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S1_OutRngMaxCmbMode**		
					Engine running for a time longer than	0.00 s		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Upstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 1	P2209	This diagnosis verifies if the Upstream NOx sensor Heater raw resistance is in range	This diagnosis verifies if the Upstream NOx sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	 > 0.03 % <- 0.03 %	Powertrain relay voltage No loss of communcation with Engine Out Nox Sensor No DTC set: No failure on NOx Sensor Bus relay circuit NOx Sensor Bus relay is commanded ON Delay timer once sensor supply is in range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active	>11.00V CAN_LostComm_F11N_BusB_NOxSnsr_A ==FALSE P30B4 SBR_RlyFA==FALSE TRUE >45 sec > 180 sec >5 sec 30 sec	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Upstream Nox sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage <9.90 V	NOx sensor is Gen3.0	TRUE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	>0sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Downstream Nox sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 9.90 V	NOx sensor is Gen3.0	TRUE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	>0sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit Low Voltage	P2210	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Upstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Performance (3 intake air pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			BARO Pressure OR BARO Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	< 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:	>5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Low (Diesel, pull-down)	P2228	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 35.5 % of 5 Volt Range (This is equal to 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit High (Diesel, pull-down)	P2229	Detects a continuous short to power in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 94.0% of 5 Volt Range (This is equal to 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. 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”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (3 intake air pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	< 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:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C Low (Diesel, pull-up)	P227C	Detects a continuous short to ground in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	<39.3% of 5 Volt Range (This is equal to 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C High (Diesel, pull-up)	P227D	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	> 90.0% of 5 Volt Range (This is equal to 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. 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”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO C readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 - Forced Engine Shutdown	P228A	Determine when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	>40 MPa ≥ Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Run crank voltage Engine running Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)* No DTC active since key is on:	> 11.0V P000F	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 2 - Forced Engine Shutdown	P228B	Determine when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	>40 MPa > 15 to 290 MPa (see table **P228B Pressure Regulator completely closed command**)	Run crank voltage Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)*	> 11.0V	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low	P228C	Determine when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	>12to 12 MPa (see table **P228C Positive rail pressure deviation (MU))**	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature No DTC active since key is on:	> 11.0V >20.0 mm^3/stroke == 1.00 == FALSE == 1.00 > 60.00 == 1.00 > -20.00 P000F	640 failures out of 800 samples 12.5 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint -		Run crank voltage	> 11.0V	640 failures out	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			measured rail pressure	>12 to 12 MPa (see table **P229A Positive rail pressure deviation (PR))**	Engine running Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 >20.0 mm^3/stroke == 1.00 = FALSE) == 1.00 >60 kPa) == 1.00 >-20 °C)	of 800 samples 12.5 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High	P228D	Determine when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -17to -17MPa (see table **P228D Negative rail pressure deviation (MU)**	Run crank voltage Engine running Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	> 11.0V >20.0 mm^3/stroke > -40 °C == 1.00 = FALSE) == 1.00 > 60.00 kPa) ==1.00 > -20.00 °C)	640 failures out of 800 samples 12.5 ms/sample	Type A, 1 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	<-17MPa	Run crank voltage Engine running	> 11.0V	640 failures out of 800 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							12.5 ms/sample	
					Pressure Regulator controlled in closed loop (refer to RailPresCntrl)			
					Fuel injected quantity	>20.0 mm^3/stroke		
					(Low fuel level calibrated as enabling condition	==1.00		
					OR			
					LowFuelConditionDiagnostic	= FALSE)		
					(Air ambient pressure calibrated as enabling condition	== 1.00		
					OR			
					Air ambient pressure	>60 kPa)		
					(Air ambient temperature calibrated as enabling condition	== 1.00		
					OR			
					Air ambient temperature	>-20 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 2 Performance	P2293	Determine when rail pressure is above maximum threshold when pressure is governed by Pressure Regulator valve.	Rail pressure	> 6 7 to 217 MPa (see table **P2293 Maximum rail pressure with PR)**	Run crank voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntiT)*	> 11.0V	160 failures out of 229 samples OR 160 continuous failures out of 229 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit	P2294	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve 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: impedance between signal and controller ground	> 200 kQ	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 6.0V	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit Low Voltage	P2295	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve 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: impedance between signal and controller ground	<0.5 Q	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 6.0V	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit High Voltage	P2296	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve 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: impedance between signal and controller power	<0.5 Q	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 6.0V	44 failures out of 88 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 2 - NOxS_CurrPerf_B1S2	P229F	This diagnosis verifies that Downstream NOx sensor embedded current control circuit status is healthy	Check if the NOx2 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note:	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 < 426nA/10msec c) Ip1 within the interval of -40 uA... 19 uA d) Delta Ip1 < 2.4 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Ip1 within the interval of -40uA... 19uA b) Delta IpO< 300 uA/10 msec c) Delta Ip1 z 2.4 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx2 sensor No 02 plausibility in load fault on NOx2 Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	>11.00V TRUE FALSE > 9.90 V TRUE TRUE < 0.03 % >- 0.03% > 10.00 sec TRUE NOX_Snsr2_FltSt ==FALSE OXY_NOx2ChkLoadFlt ==FALSE **NOX_S2_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			TOTAL_time= ON_time +OFF_Time		No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Downstream NOx sensor read out of range low	Check if the NOx2 sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag No 02 plausibility in load fault on NOx2 No DTC active:	>-1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 9.90 V TRUE N0X_N0x2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE P30B5	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Downstream NOx sensor read out of range high	Check if the NOx1 sensor NOx concentration raw read is out of higher range: NOx raw read	 >2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 sensor No electrical failure on NOx2 sensor Combustion mode dependent enabling flag No 02 plausibility in load fault on NOx2 No DTC active:	>11.00V TRUE CAN_LostComm_F1N_BusB_NOxSnsr_B > 9.90 V TRUE N0X_N0x2_StBitChkFlt ==FALSE NOX_Snsr2_ElecFA ==FALSE **NOX_S2_OutRngMaxCmbMode** OXY_NOx2ChkLoadFlt ==FALSE P30B5	Time counter: 320 fails out of 400 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit	P22A3	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Supply pin (H+)	open circuit on H+ pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE	Task=25ms	
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Supply pin (H+)	groundshort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Downstream NOx gen3 sensor Heater Supply pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Supply pin (H+)	powershort on H+ pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 2	P22A7	This diagnosis verifies if the Downstream NOx sensor Heate raw resistance is in range	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	 < 0.03 % >- 0.03 %	Powertrain relay voltage No loss of communcation with Nox2 Sensor No DTC set: No failure on NOx Sensor Bus relay circuit NOx Sensor Bus relay is commanded ON Delay timer once Sensor supplyisin range (> 10.8 V) Delay timer once Sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active	>11.00V CAN_LostComm_F11N_BusB_NOxSnsr_B ==FALSE P30B5 SBR_RlyFA==FALSE TRUE >45 sec > 180 sec >5 sec 30 sec	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Low Voltage	P22A8	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	NOx sensor is Gen3.0	TRUE	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Downstream NOx gen3 sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	NOx sensor is Gen3.0 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	TRUE >11.00V TRUE FALSE > 9.90 V TRUE P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Slow Response Low to High Bank 1 Sensor 1	P22F9	This diagnosis verifies the dynamic behaviour of Upstream NOx sensor during increasing NOx concentration transient	Check if there is a slow dynamic behaviour of Upstream NOx sensor raw signal read during increasing NOx concentration maneuver (load increase) Delay_Timer_NOx_Raw Delay time starts when NOx model concentration reaches 30 ppm and completes when NOx1 Sensor raw reaches 30 ppm. Relative_timer= (Timer_NOx_Raw- Timer_NOx_Model) / Timer_NOx_Model Timer_NOx_Raw Time starts once NOx1 raw signal reaches 30 ppm and completes once the raw signal reaches 220 ppm. Timer_NOx_Model Time starts once NOx model concentration reaches 30 ppm and completes once the raw signal reaches 220 ppm.	Delay_Timer_NOx_Raw and Relative_timer are processed with First Order Lag Filter Logic: > 1 sec OR > 4 %	Engine is running Powertrain relay voltage Combustion mode dependent enabling flag NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication No electrical failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No current control failure on NOx1 Sensor Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active No failure on high pressure fuel rail system No failure on injectors No failure on intake manifold absolute pressure Sensor	TRUE >11.00V **NOX_NOx1_IncrDynCmbMode** TRUE CAN_LostComm F1N_BusB_NOxSnsr_A == FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_OutOfRngLoFit ==FALSE NOX NOx1 OutOfRngHiFit ==FALSE NOX_NOx1_StBitChkFlt ==FALSE TRUE FAD_SQA_LrnET_Enbl ==FALSE FHPJnjLeakageFA ==FALSE FUL_GenericlnjSysFlt ==FALSE MAP_SensorFA==FALSE	More test per trip are allowed with First Order Lag Filter Logic. Total_Timer NOx Sensor dynamic observation maximum time is 8 sec. Once reached the diagnostic provides a result.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on mass air flow Sensor	MAF_MAF_SnsrFA ==FALSE		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on any input used by the Engine Out NOx model	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					No failure on pressure measurement at NOx Sensor location	NOX_Snsr1_PresFlt ==FALSE		
					No DTC set:	P30B4		
					Valid NO2/NOx ratio measurement at NOx Sensor location	NOX_Snsr1_NO2_NOx_RatVld ==TRUE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Intake manifold absolute pressure	< 950 kPa		
					Engine Out NOx Sensor raw concentration	< 79 ppm		
					Engine working point stability conditions: a) Modeled Engine Out NOx concentration	< 40 ppm		
					b) Engine speed	> 600 rpm < 3,500 rpm		
					c) Injection fuel quantity requested	> 3 mm^3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					d) condition a) b) c) are fulfilled for time Once all condition above are fulfilled diagnostic run whenever all the following condition are verified (fuel stepdetection logic within a time window): e) Injected fuel quantity request f) condition e) is fulfilled for time	>0sec > 12mm^3 <(1 sec+ 8 sec)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 1	P22FB	This diagnosis verifies the plausibility of Upstream NOx sensor signal	Check if (Upstream NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -29% OR >80.00%	Engine is running Powertrain relay voltage No failure on any NOx model inputs Injection small quantity adjustment (SQA) learning is not active No failure on NOx1 CAN communication No electrical failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No current control failure on NOx1 Sensor No DTC set: No failure on outside air temperature Sensor No failure on ambient air temperature Sensor no falut on upstream catalyst exhaust pressure	TRUE >11.00V EXM_NOxMdl_ExhMnfdNotVld ==FALSE FAD_SQA_LrnET_Enbl ==FALSE CAN_LostComm_F1N_BusB_NOxSnsr_A ==FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_OutOfRngLoFlt ==FALSE NOX_NOx1_OutOfRngHiFlt ==FALSE NOX_NOx1_StBitChkFlt ==FALSE P30B4 OAT_PtEstFiltFA ==FALSE AmbPresDfltdStatus ==FALSE EGP_PresCatUpFlt ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 test per trip are allowed The signal for the monitor check is calculated at first collecting and averaging 200.00 samples, than filtering the resulting mean value by means of a first-order filter. The filter gain calibration (1) can assume the following values: -0.50 if FIR is active - 0.35 if RR is active -0.20 if neither FIR and RR are active	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					model inputs No failure on engine coolant temperature Sensor No failure on injectors No failure on high pressure fuel rail system No failure on intake manifold absolute pressure Sensor Modeled Engine Out NOx concentration Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms. b) condition a) is fulfilled for time Ambient air pressure Outside air temperature Combustion mode dependent enabling flag	ECT_Sensor_FA ==FALSE FUL_GenericlnjSysFlt ==FALSE FHPJnjLeakageFA ==FALSE MAP_SensorFA==FALSE > 100 ppm <5 ppm >5.00 sec >72 kPa <200 kPa >-9°C < 300°C **NOX_S1_PlausChkEnblCmbMode**	(1)The EWMA filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Intake manifold absolute pressure	< 250 kPA		
					Injection fuel quantity requested	For normal combustion mode: >25.00 mm^3 < 57.00 mm^3 For other combustion modes: > 15mm^3 <30mm^3		
					Engine speed	For normal combustion mode: > 1,050 rpm <1,950 rpm For other combustion modes: > 1,200 rpm <3,200 rpm		
					Engine coolant temperature	>70 °C <129 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Downstream NOx sensor sensing cells integrity during afterrun	Check if there is any clogging in the Downstream NOx sensor measurement cavities that could result in reduced NOx-sensitivity. The sensor internal operating current set-points are changed such way, that the 02 concentration in 2nd sensor cavity is around WOOppm. One test result is measured in fresh sensor state (at supplier plant) and stored in the sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	 >125% OR < 80%	No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor No failure on NOx2 CAN communication No DTC active: No failure on NOx1 Sensor No failure on 02 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on crank Sensor No failure on exhaust temperature Sensor (downstream SCR) No failure on HC injector No failure on Vehicle	N0X_Snsr2_ElecFA ==FALSE NOX_NOx2_OutOfRngLo Fit ==FALSE N0X_N0x2_0ut0fRngHi Fit ==FALSE CAN_LostComm_F 11N_B u sB_NOxSnsr_B ==FALSE P30B5 N0X_Snsr1_N0x_Flt ==FALSE 0XY_N0x1_02_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE CrankSensor_FA ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor FA	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Speed Sensor	==FALSE		
					No failure on any input of SCR chemical model	SCR_ChemicalMdlFlt ==FALSE		
					No current control failure on NOx2 Sensor	N0X_N0x2_StBitChkFlt ==FALSE		
					No failure on 02 from N0x2 plausibility diagnostics	OXY_NOx2_O2_Flt ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					Powertrain relay voltage	>11.00V		
					N0x2 sensor supply in range	> 9.90 V		
					N0x2 sensor dewpoint is reached	TRUE		
					(N0x2 Sensor heater raw resistance - N0x2 Sensor heater target resistance) / N0x2 Sensor heater target resistence	< 0.03 % >- 0.03%		
					a)combustion mode dependent enabling flag	**NOX_NOx2SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	>0sec		
					c) engine speed	>0rpm < 1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					e) After injection pulse is not used for time	>0sec		
					f) exhaust temperature Sensor (downstream SCR)	>-7 °C <265 °C		
					g) exhaust mass flow	< 40 g/s		
					h) NH3 concentration	<20 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) 02 concentration from N0x1	>10%		
					i) NOx concentration from N0x1	< 300 ppm		
					I) conditions k) i) are fulfilled for time	>0sec		
					m) duty cycle applied to the HC injector driver	<1 %		
					n) condition m) is fulfilled for time	> 5 sec		
					o) time between key off and last overrun	> 15 sec		
					p) time between key off and last DPF regen	> 15 sec		
					q) engine speed in idle range	< 800 rpm		
					r) fuel request in idle range	<20 mm^3		
					s') conditions a) r) is	< 1,800 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					fulfillled for time t) timer of condition s) is reset if one of the following condition is fulfilled (idle off recognition - t) conditions):	>200 °C		
					t.1) exhaust temperature (downstream SCR)	> 5 sec		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 5mph		
					t.3) vehicle speed	> 5 sec		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 40 g/sec		
					t.5) exhaust mass flow	> 5 sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	< 10g/s		
					u) HC mass flow (SCR downstream) Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)	> 200 g/s		
					u.1) exhaust temperature (downstream SCR)	> 20 sec		
					u.2) condition u.1) is fulfilled for time (once			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					condition u) has been detected) u.3) vehicle speed u.4) condition u.3) is fulfilled for time (once condition u) has been detected) u.5) exhaust mass flow u.6) condition u.5) is fulfilled for time (once condition u) has been detected) v) deceleration before keyoff. w) condition v) could be ignored if idle engine condition w.x) is fulfilled w.1) engine speed in idle range w.2) condition w.1) fulfilled for time Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off	>=5mph > 10 sec >20g/s > 5 sec < 5.00 m/s < 1.00 rpm < 10.00 rpm > 8.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249D	This diagnosis checks if the DEF injection system has exceeded the limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF > OBD high threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) higher than calibratable threshold	LTAF > 1.90	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Reductant Injection Control At Limit - Flow Too High	P249E	This diagnosis checks if the DEF injection system has exceeded the limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF < OBD low threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) lower than calibratable threshold	LTAF<0.41	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199) 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 > 1,298 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 >=5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unmetered Fuel - Forced Engine Shutdown	P25BD	Determines if engine overspeed condition is occuring when no fuel is being delivered	Engine Speed exceeds a threshold for a period of time	Fail Condition: Engine Speed > 5,200 RPM		Engine Speed > 1,500 RPM	Fail threshold: Overspeed condition TRUE > 100.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed < (5,200 - 300) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 100.0 milliseconds	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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] **P2635 Threshold Low** OR >= High Threshold [Supporting Table] **P2635 Threshold High**	a) Diagnostic enabled [FDBR_b_FSRD] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] 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_FltThrshs] c8) Engine Speed Status Valid c9) FAB_FuelPmpCktFA c10) Fuel Control Enable	a) == TRUE b) >= 40.00 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Active [DTCP12A6]			
					c11) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c11)<> TRUE		
					c12) Fuel Pump Speed Fault Active [DTCP129F]	c12) <> TRUE		
					c13) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_lnfo1_UcodeCmFADTC P165C]	c13) <> TRUE		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	c14] <> TRUE		
					c15) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c15) == CeFDBR_e_WiredTo_FTZM		
					c16) Sensor Bus Relay On	c16) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == NORMAL		
					g) Run_Crank input circuit voltage	g) 9.00 volts <= Run_Crank_V <= 32.00 volts		
					h) High Pres Fuel Pump	h) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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_A RC_ChkErr DTC] n) Timer - Diagnostic Enable	j) <> Disabled Mode AND a8b) <> ZeroFlow Mode k) 0.05 grams/sec <= InstFuelFlow <= Max Allowed Flow [Supporting Table] **P2635 Max Fuel Flow** m1)<> TRUE m2) ==TRUE m3) <> TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shared High Side Drive #2 Control Circuit Low (STG)- (GEN III Controllers ONLY)	P2670	Controller specific output driver circuit diagnoses the shared high sided driver # 2 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.	< 0.5 Q impedance between output and controller ground	Shared high side drive #2 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 0 >=11.00 >6.00 = ON	5 failures out of 10 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shared High Side Drive #2 Control Circuit High (STP)- (GEN III Controllers ONLY)	P2671	Controller specific output driver circuit diagnoses the shared high sided driver # 2 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.	< 0.5 Q impedance between output and controller power	Shared high side drive #2 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1 >=11.00 >6.00 = ON	20 failures out of 25 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Overspeed	P26FA	This DTC indicates a out of range high failure of the pump speed.	Actual pump speed	>= 4,500 rpm	Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low while the transfer case control module command state is4WD high. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD low ratio window	4WD low ratio window < 2.85 > 2.50	Transfer case range command	= 4WD high	Fail count > 280.00 Out of sample count > 400.00 seconds Update rate 12.5 milliseconds	Type A, 1 Trips
					High range diagnostics enabled calibration	= TRUE		
					Engine torque	>= 60.00 Nm AND <= 1,000.00 Nm		
					Ignition voltage	>= 9.00 V for >= 5.00 seconds		
					Battery voltage	>= 9.00 V for >= 5.00 seconds		
					Engine speed	>= 700.00 RPM for >= 5.00 seconds		
					Vehicle speed	>= 5.00 KM/H for >= 5.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Transmission selected gear AND Diagnostic enable for currently selected transmission gear (Reverse, 1st through 10th gear, individually calibrated)	Reverse or Drive (1st gear through 10th gear) = TRUE		
					transmission gear shift direction	No shift in progress >= 5.00 seconds		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	INACTIVE = TRUE		
					Transfer case range	= Transfer case range previous >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C >=5.00 seconds		
					Run crank active	TRUE		
					Diagnostics system calibration enabled	TRUE		
					PTO OR ratio diagnostics in PTO enabled	active = TRUE		
					DTCs			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Transmission Turbine Angular Velocity Validity Transmission Shift Lever Position Validity Transmission Output Shaft Angular Velocity Validity P0700		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio while the transfer case control module command state is 4WD low. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD high ratio window	4WD high ratio window < 1.20 > 0.80			Fail count > 280.00 Out of sample count > 400.00 seconds Update rate 12.5 milliseconds	Type A, 1 Trips
					Transfer case range command	= 4WD low		
					Low range diagnostics enabled calibration	= TRUE		
					Engine torque	>= 60.00 Nm AND <= 1,000.00 Nm		
					Ignition voltage	>= 9.00 V for >= 5.00 seconds		
					Battery voltage	>= 9.00 V for >= 5.00 seconds		
					Engine speed	>= 700.00 RPM for >= 5.00 seconds		
					Vehicle speed	>= 5.00 KM/H for >= 5.00 seconds		
					Transmission selected gear AND	Reverse or Drive (1st gear through 10th gear)		
					Diagnostic enable for currently selected	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission gear (Reverse, 1st through 10th gear, individually calibrated)			
					Transmission gearshift direction	No shift in progress for >= 5.00 seconds		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	INACTIVE = TRUE		
					Transfer case range	= Transfer case range previous for >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C for >= 5.00 seconds		
					Run crank active	TRUE		
					Diagnostics system calibration enabled	TRUE		
					PTO OR ratio diagnostics in PTO enabled	NOT Active TRUE		
					DTCs	Transmission Turbine Angular Velocity Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Transmission Shift Lever Position Validity Transmission Output Shaft Angular Velocity Validity P0700		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio	P279C	Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	Measured transfer case ratio is in 4WD low ratio window OR Measured transfer case ratio is in 4WD high ratio window	4WD low ratio window < 2.85 > 2.50 4WD high ratio window < 1.20 > 0.80			Fail count > 800.00 Out of sample count > 1,000.00 seconds Update rate 12.5 milliseconds	Type A, 1 Trips
					Transfer case range command	= 4WD neutral		
					Neutral range diagnostics enabled calibration	= TRUE		
					Engine torque	>= -20.00 Nm AND <= 1,000.00 Nm		
					Ignition voltage	>= 9.00 V for >=5.00 seconds		
					Battery voltage	>= 9.00 V for >= 5.00 seconds		
					Engine speed	>= 700.00 RPM for >= 5.00 seconds		
					Vehicle speed	>= 5.00 KM/H for >= 5.00 seconds		
					Transmission selected	Reverse or Drive (1st		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					gear AND Diagnostic enable for currently selected transmission gear (Reverse, 1st through 10th gear, individually calibrated)	gear through 10th gear) = TRUE		
					Transmission gearshift direction	No shift in progress for >= 5.00 seconds		
					Tap up/down mode OR Diagnostic enable for Tap up / tap down mode in current transmission gear (Reverse, 1st through 10th gear, individually calibrated)	INACTIVE = TRUE		
					Transfer case range	= transfer case range previous for >= 5.00 seconds		
					Transmission fluid temperature	>= -7.00 degree C for >= 5.00 seconds		
					Run crank active	NOT ACTIVE		
					Diagnostics system calibration enabled	TRUE		
					PTO OR Ratio diagnostics in PTO	NOT ACTIVE TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled DTCs	 Transmission Turbine Angular Velocity Validity Transmission Shift Lever Position Validity Transmission Output Shaft Angular Velocity Validity P0700		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Sensor B Circuit Low	P2802	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a short to ground failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates short to ground failure Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to ground	< 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean > 0.00 volts < 7.78 % > 7.78 % CeTRGD_e_VoltDirctProP	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Sensor B Circuit High	P2803	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a power 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 or power short failure Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit or power short	< 0.5 Q impedance between signal and controller voltage source OR > 200 K Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean > 0.00 volts > 92.22 % < 92.22 % CeTRGD_e_VoltDirctProP	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Underspeed	P2BA0	This DTC indicates a out of range low failure of the pump speed.	Actual pump speed	< -50 rpm	Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Delivery Performance (EWMA filtered)	P2BAA	Monitoring evaluates if DEF line pressure drops is as large as expected by commanded DEF injection flow.	EWMA of Pressure Drop Deviation Pressure Drop Variation is evaluated as: Average of DEF line pressure when no dosing - Average of DEF line pressure when performing test injections - **P2BAA RDP Min Press Drop** Pressure Drop Variation is saturated to EWMA filter coefficients: Standard Fast Initial Response Rapid Response	> 0 kPa 0.00 0.34 0.50 0.15	Ambient Air Temperature Barometric Pressure DEF Injector Component Management Ready DEF Injector Cooling Request DPF Regeneration Active DEF Injector Temperature DEF Injector Temperature variation of DEF Injector temperature within a time period Integrated DEF Injected Mass Integrated DEF Injected Mass Integrated Upstream NOx Flow Upstream SCR Exhaust Flow DEF System Hydraulic System Shutoff No DEF Mass Flow less than calibratable mass for calibratable time DEF Tank Status	> -20.00 °C > 70.00 kPa == TRUE == FALSE == FALSE >230.00 °C < 500.00 °C < 3.00 °C = 100ms * 100.00 >3,000.00 mg < 10,000,000,000.00 mg >=0.00 mg >8.00 g/s == FALSE <1,200.00 mg/s >= 100ms * 0.00 = NOT FROZEN	Function Task: 25ms	Type A, 1 Trips , EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault for Upstream DEF Injector Temperature No fault for Outside Air Temperature No fault for Upstream SCR Exhaust Flow No fault for Barometric Pressure No fault for Upstream NOx Sensor Concentration No fault for Vehicle Speed Sensor Vehicle Speed below calibratable threshold for calibratable time No DEF Metering Valve Tip Stuck Fault Engine Mode (Fuel injection quantity request OR Idle speed control active) (Engine speed OR Idle speed control active) (DEF pressure deviation factual - desired) when no	[OAT_PtEstFiltFA or OAT_OAT_SnsrNon Emiss FA] EXF_TotExhSCR_UpFlt AAP_AmbientAirPresDfltd == FALSE VehicleSpeedSensor_FA <= 3.00 km/h >= 100ms * 10.00 SCR_TipStuckFltSt == RUNNING < 1,000.0 mm ^3 0 < rpm < 10,000		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					dosing OR amount of no dosing phase cycles)	<= 500 kPa >= 0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too Low	P2C1F	Determines when rail pressure is lower than desired setpoint during Cold Start	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	> 12 to 12 MPa (see table **P228C Positive rail pressure deviation (MU))** > 12to 12 MPa (see table **P229A Positive rail pressure deviation (PR))**	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR (Fuel injected quantity (Low fuel level calibrated	== TRUE >= 11.0V == True == True >20.0 mm^3/stroke ==1.00 == False) ==1.00 >= 60 kPa) ==1.00 >=-20 °C)) >20.0 mm^3/stroke	640 failures out of 800 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	==1.00 == False) ==1.00 >= 60 kPa) ==1.00 >=-20 °C))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too High	P2C20	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	< -17 to -17MPa (see table **P228D Negative rail pressure deviation (MU)** < -17MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR	== TRUE >= 11.0V == True == True >20.0 mm^3/stroke > -40 °C == 1.00 == False) == 1.00 >= 60 kPa) == 1.00 >=-20 °C)	640 failures out of 800 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 > 20.00 mm^3/stroke ==1.00 == False) ==1.00 >= 60 kPa) ==1.00 >=-20 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Preformance	P2C48	This DTC indicates a pump flow deviation failure. An expected phase current of the pump is superviced to detect any pump malfunction.	Absolute Pump AC (Phase) current error = (Actual pump speed refer to **PmpPerf: Tabel to estimate the expected pump AC current based on the pump speed,** in Supporting table) - Actual Pump AC current For more than	> 1.00 A > 5.00 sec	Diagnostic enabled Actual pump speed WCP_Current_OOR_FA Powertrain relay voltage Or LTL direct connected too Batt - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	[illegible]	10 failures out of 12 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Temperature Too Low	P2D45	This monitoring detects when DEF tank heater is affected by a fault that causes low temperature increase rate.	Maximum difference between current tank temperature and tank temperature sampled at begin of driving	<0.0 °C	Sensor Bus Wake Up signal is active No test status has been reported for this monitoring since begin of driving cycle No fault for serial communication with DEF device (SCRPM) (e.g. ARC/Checksum) No fault for sensor bus wake up signal No fault for DEF tank temperature sensor No electrical fault for tank heater Tank heater active DEF tank temperature at begin of driving cycle [(Tank heater has been continuously commanded active AND battery system voltage (RunCrank) is continuously greater than 11 V for a time)OR(Tank heater has been continuously commanded active AND battery	SCR_DEFTH_ElecFltSt SCR_DEFTH_SplyVoltHiFA <0.0 °C >0.00 s < 0.00 s	As enable conditions are met.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					system voltage (RunCrank) is continuously greater than 11 V for a time since begin of driving cycle AND difference between current tank temperature and tank temperature sampled at begin of driving cycle)]	>0.0 °C >0.00 s < 0.00		
					Engine soak time	> 0.00		
					Engine run time	< 0.00		
					Difference between current ambient temperature and DEF tank temperature sampled at begin of driving cycle is within calibratable range			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Signal Message Counter Incorrect Bank 1 Sensor 1	P30B4	This DTC monitors for an error in communication with the Bank 1 Sensor 1 NOx Sensor Signal Message.	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Engine Out data over CAN bus is incorrect for	>=8.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000.00 milliseconds		
					Power Mode	= Run		
			out of total samples	>= 10.00 counts	Powertrain Relay Voltage	>=11.00 Volts		
			Or		Run/Crank Ignition Voltage	>=11.00 Volts		
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 1 data over CAN bus is incorrect for	>=8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 2 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 3 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Or Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Error Engine Out data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Engine Out NOx Sensor Data 6 data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Component Information Engine Out data over CAN bus is incorrect for out of total samples	>=8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >=8.00 counts >= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Signal Message Counter Incorrect Bank 1 Sensor 2	P30B5	This DTC monitors for an error in communication with the Bank 1 Sensor 2 NOx Sensor Signal Message.	Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Oxygen Post Catalyst data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Self Diagnostic Feedback Status 1 data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Self Diagnostic Result data over CAN bus is incorrect for out of total samples Or Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Lambda Binary Voltage Post Catalyst data over CAN	>=8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >=8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >=11.00 Volts >=11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			bus is incorrect for	>=8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Error Post Catalyst data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Post Catalyst NOx Sensor Data 6 data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the NOx Sensor Component Information Post Catalyst over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Control Module Status Signal Message Counter Incorrect	P30BC	This DTC monitors for an error in communication with the Particulate Matter Sensor Control Module Status Signal Message.	Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Electrode Current/Voltage and Soot Sensor Status data over CAN bus is incorrect for	>= 8.00 counts	Message frame	= Is available	Executes in 10ms loop.	Type B, 2 Trips
			out of total samples	>= 10.00 counts	All the following conditions are met for	>= 3,000.00 milliseconds		
			Or		Power Mode	= Run		
			Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Input/Output Error and Heater Duty Cycle data over CAN bus is incorrect for	>=8.00 counts	Powertrain Relay Voltage	>=11.00 Volts		
			out of total samples	>= 10.00 counts	Run/Crank Ignition Voltage	>=11.00 Volts		
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Heater Resistance and Soot Sensor Regeneration Setpoint Temperature data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Soot Sensor Control Unit Information data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Electrode Temperature/Soot Sensor Supply Voltage Extended Range data over CAN bus is incorrect for	>=8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Temperature Compensated Electrode Current data over CAN bus is incorrect for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count or Protection Value of the Soot Sensor Probe Current Sensitivity Factor data over CAN bus is incorrect for	>= 8.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			out of total samples	>= 10.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Motor Current Out Of Range High	P3198	This DTC indicates a out of range high failure of the pump motor current.	Actual Motor Current	> 10.00 A	Diagnostic enabled ***************************** Actual pump speed ***************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True ***************************** > 2,800 rpm ***************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Motor Current Out Of Range Low	P3199	This DTC indicates a out of range low failure of the pump motor current. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0.	Actual Motor Current For more than	< -0.20 A > 1.00 sec	Diagnostic enabled Actual pump speed Powertrain relay voltage Or WCP direct connected too Batt - Pump enabled - Engine does not crank - Diagnostic system not disabled- No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True > 2,800 rpm >=11.0 Volts False	4 failures out of 5 samples 1000ms / sample	Type B, 2 Trips
			Actual Motor Current For more than	< -0.20 A > 1.00 sec	Diagnostic enabled Actual pump speed Powertrain relay voltage Or WCP direct connected too Batt - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True = 2,800 rpm >=11.0 Volts False	4 failures out of 5 samples 1000ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	5 counts (equivalent to 0.83 seconds) 0.83 seconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for Normal CAN transmission on Bus Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is on Otherwise: If power mode = Run/ Crank: Power Mode If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage	 > 15.00 milliseconds >8.41 Volts >=5.00 seconds Enabled = Run >=11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 impending Power Mode Battery voltage	>=9.00 Volts > 15.00 milliseconds >8.41 Volts >=6.41 Volts Enabled OBD Controller = False = Not crank >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds before the sample time of is reached	5 counts (equivalent to 0.83 seconds) 0.83 seconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for Normal CAN transmission on Bus Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is on Otherwise: If power mode = Run/ Crank: Power Mode If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage	> 15.00 milliseconds >8.41 Volts >=5.00 seconds Enabled = Run >=11.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 impending Power Mode Battery voltage	>=9.00 Volts > 15.00 milliseconds >8.41 Volts >=6.41 Volts Enabled OBD Controller = False = Not crank >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0F9	>0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $189	>0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message $197	> 0.50 seconds				
			Message $199	> 0.50 seconds	If message is on Bus S: U0076	Not Active		
			Message $19D	> 0.50 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $1AF	>0.50 seconds	Run/Crank ignition voltage	>8.41 Volts		
			Message $1F5	>0.50 seconds				
			Message $4C9	> 10.00 seconds	Bus is enabled for	>=0.40 seconds		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII:			
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD:			
					Run/Crank ignition voltage	>=9.00 Volts		
					If Secure:			
					Starter motor engaged for Or	> 15.00 milliseconds		
					Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure:			
					Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for Message $1CC Message $1CF	 >0.50 seconds > 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 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 OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Glow Plug Control Module	U0106	This DTC monitors for a loss of communication with the Glow Plug Control Module	Message is not received from controller for Message $3BD	> 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII:			
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD:			
					Run/Crank ignition voltage	>=9.00 Volts		
					If Secure:			
					Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure:			
					Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		
					Batterv voltaoe	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Turbocharger Boost Control Module	U010C	This DTC monitors for a loss of communication with the Turbocharger Boost Control Module	Message is not received from controller for Message $099 Message $499	 > 10.00 seconds > 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or			
					Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Or			
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR)	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					If message is on Bus A:			
			Message $092	> 10.00 seconds	U0073	Not Active		
			Message $4CC	> 10.00 seconds	If message is on Bus B: U0074	Not Active		
			Message $4CD	> 10.00 seconds	If message is on Bus S:			
			Message $4E5	> 10.00 seconds	U0076	Not Active		
			Message $4E6	> 10.00 seconds	Starter motor engaged for	> 15.00 milliseconds		
					Or			
			Message $4E7	> 10.00 seconds	Run/Crank ignition voltage	>8.41 Volts		
			Message $4E8	> 10.00 seconds				
					Bus is enabled for	>=0.40 seconds		
			Message $4E9	> 10.00 seconds				
			Message $4EA	> 10.00 seconds	The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Or Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module (OBD Module ID 7E5).	Message is not received from controller for Message $0C1 Message $0C5 Message $1C7 Message $1E9 Message $2F1 Message $2F9	>0.50 seconds >0.50 seconds >0.50 seconds >0.50 seconds > 10.00 seconds > 0.50 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Or Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $0F1 Message $12A Message $1E1 Message $1F1 Message $1F3 Message $3C9 Message $3CB Message $3F1 Message $451 Message $4D7 Message $4E1 Message $4E9	 >0.50 seconds > 1.00 seconds > 0.50 seconds > 0.50 seconds > 10.00 seconds > 10.00 seconds > 10.00 seconds > 10.00 seconds > 0.50 seconds > 10.00 seconds > 10.00 seconds > 10.00 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or	> 15.00 milliseconds		
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With 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: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15.00 milliseconds		
					Or Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Or Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus with Shutter Module A	Communication failures equals or exceeds	3.00 counts	General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					U1345	Not active this key cycle		
					Subnet configuration not used Or Device is calibrated as present	Used		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal LIN transmission on Bus	Enabled		
					Controller not in programming mode			
					If UCAP is present on bus, starter motor is not engaged	Not Present		
					Power mode And	= Run		
					Run/Crank ignition voltage Or	>=11.00 Volts		
					Battery voltage	>=11.00 Volts		
					And the following criteria have been enabled for	>= 400.00 milliseconds		
					LIN bus is awake			
					If controller is an OBD controller:			
					Power mode	= Not off		
					Or			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If controller is a non-OBD controller:			
					Power mode	= Run or accessory or crank if diagnostics are enabled during crank		
					Enabled during crank:	Disabled		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module B	U0285	This DTC monitors for a loss of communication on the LIN bus with Shutter Module B.	Communication failures equals or exceeds	3.00 counts	General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					U1345	Not active this key cycle		
					Subnet configuration not used Or Device is calibrated as present	Used		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal LIN transmission on Bus	Enabled		
					Controller not in programming mode			
					If UCAP is present on bus, starter motor is not engaged	Not Present		
					Power mode And	= Run		
					Run/Crank ignition voltage Or	>=11.00 Volts		
					Battery voltage	>=11.00 Volts		
					And the following criteria have been enabled for	>= 400.00 milliseconds		
					LIN bus is awake			
					If controller is an OBD controller:			
					Power mode	= Not off		
					Or			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If controller is a non-OBD controller: Power mode Enabled during crank: Controller type: OBD Controller	 = Run or accessory or crank if diagnostics are enabled during crank Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor A	U029D	This DTC monitors for a loss of communication with NOx Sensor A.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0B0	>0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $0B1	>0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message $0B5	> 10.00 seconds				
			Message $0B7	> 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $289	> 0.50 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $296	>0.50 seconds	Run/Crank ignition voltage	>8.41 Volts		
			Message $591	> 10.00 seconds				
					Bus is enabled for	>=0.40 seconds		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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	> 15.00 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 OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor B (post catalyst NOx sensor)	U029E	This DTC monitors for a loss of communication with NOx Sensor B.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0A4	>0.50 seconds	If message is on Bus A: U0073	Not Active		
			Message $0B2	>0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message $0B6	> 10.00 seconds				
			Message $0B8	> 10.00 seconds	If message is on Bus S: U0076	Not Active		
			Message $28B	> 0.50 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message $297	>0.50 seconds	Run/Crank ignition voltage	>8.41 Volts		
			Message $592	> 10.00 seconds				
					Bus is enabled for	>=0.40 seconds		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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	> 15.00 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 OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With PM Sensor (Diesel Particulate)	U02A3	This DTC monitors for a loss of communication with the PM Sensor (Diesel Particulate).	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					If message is on Bus A:			
			Message $3A3	> 10.00 seconds	U0073	Not Active		
			Message $3A5	> 10.00 seconds	If message is on Bus B:			
					U0074	Not Active		
			Message $3A8	> 10.00 seconds				
					If message is on Bus S:			
			Message $3A9	> 10.00 seconds	U0076	Not Active		
			Message $3AA	> 10.00 seconds	Starter motor engaged for	> 15.00 milliseconds		
					Or			
			Message $497	> 10.00 seconds	Run/Crank ignition voltage	>8.41 Volts		
					Bus is enabled for	>=0.40 seconds		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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	> 15.00 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 OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss Of Communication with Low Temperature Coolant Loop Pump	U062F	This DTC monitors for a loss of communication on the LIN bus with the Low Temperature Coolant Loop Pump	Communication failures equals or exceeds	3.00 counts	General Enable Criteria: U1345 Subnet configuration not used Or Device is calibrated as present The following criteria have been enabled for Normal LIN transmission on Bus Controller not in programming mode If UCAP is present on bus, starter motor is not engaged Power mode And Run/Crank ignition voltage Or Battery voltage And the following criteria have been enabled for LIN bus is awake Power mode Or If controller is a non-OBD controller: LIN communications enabled during cranking	 Not active this key cycle 1.00 (0 indicates not used) 37,392.00 >=5.00 milliseconds Enabled 0.00(1 indicates present) = Run >=11.00 Volts >=11.00 Volts >= 400.00 milliseconds = Run or accessory 0.00(1 indicates enabled)	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power mode Controller type: OBD Controller	= Crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1	Bus off failures equals or exceeds	3.00 counts	General Enable Criteria: The following criteria have been enabled for Normal LIN transmission on Bus Controller not in programming mode If UCAP is present on bus, starter motor is not engaged Power mode And Run/Crank ignition voltage Or Battery voltage And the following criteria have been enabled for LIN bus is awake If controller is an OBD controller: Power mode Or If controller is a non-OBD controller: Power mode	 >=5.00 seconds Enabled Not Present = Run >=11.00 Volts >=11.00 Volts >= 400.00 milliseconds = Not off = Run or accessory or crank if diagnostics are enabled during crank	Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Enabled during crank: Controller type: OBD Controller	Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Fuel Pump Driver Control Module on Bus B	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus B.	Message is not received from controller for Message $0C3 Message $0CB Message $0CC Message $2C1 Message $2D7 Message $2D9 Message $3C8 Message $3EB Message $3EC Message $3EE	 >seconds >seconds >seconds >seconds >seconds >seconds >seconds >seconds >seconds >seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	 Not Active Not Active Not Active > 15.00 milliseconds >8.41 Volts >=0.40 seconds >=5.00 seconds Enabled = False >11.00 Volts = On	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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	> 15.00 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 OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Control Module Lost Communication with Engine Control Module	U18C8	This DTC monitors for a Glow Plug Control Module loss of communication with the Engine Control Module.	The GPCM Diagnostic Status Message signal in GMLAN frame $3BD from the GPCM has a value of : for the Diagnostic Status signal.	CeDFIR_e_GlowPlugCMLostCommECM	General Enable Criteria: Message $3BD U18C8 Glow Plug Control Module	 Is being received Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Lost Communication with GPCM	U18DE	This DTC monitors for a CGM Lost Communication with GPCM error as determined by the CGM	The CGM Diagnostic Status Message signal in GMLAN frame $3CF indicates that the CGM Lost Communication with GPCM DTC has set in the CGM.		General Enable Criteria: Message $3CF Central Gateway Module GPCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Position Exceeded Learning Limit (VGT Smart)	P003A	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at key off during the learning procedure is plausibile	physical travel measured at key off < low threshold OR physical travel measured at key off > high threshold	<195.00 [counts] OR >308.00 [counts]	Test enabled by calibration Key signal is off Learning procedure at key off has been successfully completed: - ambient temperature greater than a threshold; - engine coolant temperature in range; - battery voltage in range; -learning time needed smaller than a time out threshold; - no faults present on coolant temperature sensor; - no faults present on ambient temperature sensor. End Of Trip event has elapsed No fault validated on smart VGT rolling counters	==1.00 >=-60.00 (°C) <=129.00 (°C) >=10.00 (°C) <=30.00 (V) >=9.00 (V) <=3.00 (s) ECT_Sensor_FA ==FALSE OAT_PtEstFiltFA ==FALSE CFM_VGT_CommFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Performance (VGT Smart)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	>16.00 [%]	Cold Start strategy NOT enabled Test enabled by calibration System out of the cranking phase PT relay supply voltage in range VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation) VGT position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on	==TRUE ==1.00 > 11.00 [V] VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA ==FALSE <100.00 [%/s] >-100.00 [%/s] for 0.50 [s] >=0.00 [°C] ECT_Sensor_FA ==FALSE	420.00 fail count out of 520.00 sample counts Function task: 25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine coolant temperature sensor			
					Outside air temperature higher or equal to minimum threshold	>=-60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Test enabled by calibration	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>=1.00 [s]		
					Runk Crank Relay voltage in range	>11.00 [V]		
					The engine has not run for a calibratable time since last key off	>= 28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler up air temperature sensors	CIT_CAC_UpCktFA ==FALSE CIT_CAC_UpSelfCorFA ==FALSE		
					No faults detected on intake manifold air temperature sensor	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	<7.11 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 >11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	>753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	==1.00 >11.00 [V] CIT_CAC_UpCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Module Performance (VGT Smart)	POOAF	This monitor checks if the smart VGT has an internal fault	Smart actuator internal fault: Pattern Error, Overcurrent Error, Checksum Error (error information provided by the actuator)		Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No fault validated on smart VGT rolling counters HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V] CFM_VGT_CommFA ==FALSE	8.00 fail counts out of 10.00 sample counts Function task: 500 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Performance	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR (if present) are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhaust gas circuit. For OBDII market, it is used to detect a PCV disconnection. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled, to force the HP EGR to close when particular conditions are encountered, to allow the monitoring to run in idle.	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.25 [ratio] < 0.75 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range Share High Side driver closed Estimated mass airflow is valid No Electrical or offset fault present on MAF sensor OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature	P0101: MAF performance enabling==TRUE (see FreeForm) >11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVid ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE >-20.00 [°C] OAT_PtEstFiltFA==TRUE >-20.00 [°C] OAT_OAT_SnsrNonEmissFA ==FALSE	Test is evaluated after the enabling conditions are satisfied for a number of samples ==800.00 Sampling time is: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Induction air temperature	>-20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>40.00 [°C] ==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa] < 72.00 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP EGR valve position No faults detected on HP EGR valve position sensor LP EGR (if present) valve position No faults detected on LP EGR (if present) valve position sensor Engine works in IDLE, OVERRUN or HIGH LOAD condition	<= 0.00 [%] EGR_PstnSnsrFA ==FALSE <=1.00 [%] LPE_PstnSnsrFA ==FALSE Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj	> 1.25 [ratio] < 0.75 [ratio] 72.00	Intrusive Test enabled by calibration MAF rationality monitoring enabled by calibration Diagnostic has not run in current driving cycle yet Calibratable SCR dosing condition	0.00 ==TRUE P0101: MAF performance enabling==TRUE (see FreeForm) ==TRUE IF 0.00 ==TRUE: SCR dosing condition is NH3 storage control OR intrusive NH3 storage	Test is evaluated after the enabling conditions are satisfied for a number of samples ==800.00 Sampling time is: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**			control OR transient dosing control. IF 0.00 ==FALSE: No restrictions on SCR dosing		
					SCR predicted NOx conversion efficiency	> 0.60 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	<3.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					Desired fuel in range, with hysteresis	Enabled if < 0.00 [mm^3] AND > 0.00 [mm^3] Disabled if > 0.00 [mm^3] OR < 0.00 [mm^3]		
					OR			
					(Speed Control Mode is Idle	==TRUE		
					AND			
					No faults detected on Speed Control) (OBDII market only)	FULJFMJdleFuelQntyFA ==FALSE		
					PT relay supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Share High Side driver closed Estimated mass airflow is valid No Electrical or offset fault present on MAF sensor OBDII Market: Outside Ambient Temperature in range OR Fault present on Ouside Air temperature EOBD Market: Outside Ambient Temperature in range AND No Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature sensor (Enciine Coolant	==TRUE MAF_AirFlowEstdSS_Not Vid ==FALSE MAF_MAF_SnsrCktOffstF A ==FALSE MAF_MAF_SnsrCktOffstT FKO ==FALSE >-20.00 [°C] OR OAT_PtEstFiltFA==TRUE >-20.00 [°C] AND OAT_OAT_SnsrNonEmiss FA ==FALSE >-20.00 [°C] IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>40.00 [°C] ==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa] < 72.00 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					LP EGR (if present) valve position	<=1.00 [%]		
					No faults detected on LP EGR (if present) valve position sensor	LPE_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed in range OR (Speed Control Mode is Idle AND No faults detected on Speed Control) (OBDII market only) for a time Intake manifold pressure in range Intake manifold pressure is in steady state (SS) Once all the conditions above are satisfied, additional conditions on HP EGR valve must be verified within a time limit HP EGR valve position No faults detected on HP EGR valve position sensor All conditions are verified for a time	> 560.00 [rpm] < 1,000.00 [rpm] ==TRUE IAC_SystemRPM_FA ==FALSE >= 10.00[s] > 69.60 [kPa] < 130.00 [kPa] when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, | Intake manifold pressure - p_ref| < 3.00 [kPa] for maintaining the SS ON < 1.00 [s] <= 0.00 [%] EGR_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						> 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	<260.00 [Hz]	Test enabled by calibration Engine speed PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00 ==TRUE >= 250.00 [rpm] > 11.00 [V] ==TRUE >= 0.30 [s]	100.00 fail counts out of 125.00 sample counts Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit High	P0103	This monitor checks if the MAF sensor is out of electrical range high. The MAF sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	MAF frequency value	>14,400.00 [Hz]	Test enabled by calibration	1.00 ==TRUE	300.00 fail counts out of 375.00 sample counts Function task:100 ms	Type A, 1 Trips
					Engine speed	>= 250.00 [rpm]		
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side Driver closed	==TRUE		
					All conditions arevalid for a time	>= 0.30 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_Fuel Min**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Rich Bank 1	P0172	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its maximum value.	Released FSA fuel correction value	> refer to supporting table (**KtFADC_V_FSA_Fuel Max**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Retarded	P01CB	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 1 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 1 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Advanced	P01CC	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 1 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lower than a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 1 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Retarded	P01CD	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 2 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 2 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Advanced	P01CE	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 2 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >= 72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 2 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Retarded	P01CF	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 3 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >= 72.00 [kPa] >= -9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 3 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Advanced	P01D0	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 3 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >= 72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 3 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Retarded	P01D1	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 4 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 4 Injection Timing Perfomance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Advanced	P01D2	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 4 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 4 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Retarded	P01D3	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off not active NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 5 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 5 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Advanced	P01D4	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 5 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 5 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Retarded	P01D5	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 6 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 6 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Advanced	P01D6	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 6 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 6 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Retarded	P01D7	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 7 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 7 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Advanced	P01D8	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 7 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 7 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Retarded	P01D9	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA(To fail Validation)	<50.00 [%] >105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 8 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 8 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Advanced	P01DA	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQAand delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	<50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 8 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=72.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 8 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Reference temperature). Reference temperature can be selected via calibration: if 1.00 ==TRUE, it is the induction air temperature, otherwise it is the outside air temperature.	<28.84 [%]	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Air mass flow in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler and Reference temperature in range Environmental pressure in range Environmental temperature in range	1.00 ==TRUE ==TRUE >92.00 [kph] >90.00 [mg/s] <500.00 [mg/s] >70.00 [°C] ==TRUE >85.00 [%] > 1.23 [ratio] > 33.00 [°C] >69.60 [kPa] >-20.00 [°C]	Test executed after 200.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on throttle position sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on Reference temperature sensor	OAT_PtEstFiltFA ==FALSE OR IAT_SensorFA==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	CIT_CAC_UpFA==FALSE CIT_CAC_DwnFA ==FALSE		
					No fault on MAF meter	MAF_MAF_SnsrFA ==FALSE		
					No fault on Intake Manifold Pressure sensor	MAP_SensorFA==FALSE		
					All the enabling conditions last for a time	>=11.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Lower Than Expected	P026C	An error shall be detected when the fuel adjustment value (mm3) released by FSA is below a calibrated threshold.	Released FSA fuel correction value lower than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp)** multiplied per ambient air pressure correction factor B	<A*B A = (If Groupl is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECM_PresAmbWghtLo)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active) OR (DFSA Learning is active) AND (Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn) OR ((FAD_DFSA_EnblLrn) AND 1 [boolean]) > 1.00 [s] > 74.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C]	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						different from Neutral or Parking		
					for a time (only in case of Automatic Transmission)	> 1.00 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,600 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 18 [mm^{A}3] < 34 [mm^{A}3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^{A}3/25ms] > 1.00 [s]		
					m. Vehicle speed in operating range for a time	> 20 [kph] < 125 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^{A}3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)**		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OXY_eq r_T urbDwn_F SA _NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSAis above a calibrated threshold.	Released FSAfuel correction value higher than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_ CombModeGrp)** multiplied per ambient air pressure correction factor B	>A*B A = (If Groupl is selected: refer to supporting table **KtFADD_V_FSA_ECM _HiThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM _HiThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM _HiThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_EC M_PresAmbWghtHi)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active) OR ((DFSA Learning is active) AND (Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA EnblLrn) OR ((FAD_DFSA_EnblLrn) AND 1 [boolean])) > 1.00 [s] > 74.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C] different from Neutral or	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time (only in case of Automatic Transmission)	Parking > 1.00 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 40 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 1.00 [s]		
					m. Vehicle speed in operating range for a time	> 20 [kph] < 125 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)**		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OXY_eq r_T urbDwn_F SA _NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Min Limit	P02CC	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	 < **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. 1 Sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Max Limit	P02CD	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Min Limit	P02CE	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Max Limit	P02CF	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Min Limit	P02D0	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Max Limit	P02D1	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Min Limit	P02D2	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Max Limit	P02D3	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Min Limit	P02D4	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Max Limit	P02D5	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Min Limit	P02D6	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	 < **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Max Limit	P02D7	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Min Limit	P02D8	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Max Limit	P02D9	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Min Limit	P02DA	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Max Limit	P02DB	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	>200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from wide open (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Performance	P02E1	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	[Throttle Position Tracking Error] (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy NOT enabled	==TRUE	1,280.00 fail counts out of 1,600.00 sample counts 1,280.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips
					Test enabled by calibration	==1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=55.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Throttle position setpoint in steady state conditions for minimum time	>-160.00 [%/s] <160.00 [%/s] for >=0.40 [s]		
					Throttle position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	TPS_PstnShtOffReq == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor detects the Throttle valve mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured Throttle position < minimum threshold	<75.00 [%]	P02E1 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	 > 1.00 [s] TPS_PstnShtOffReq == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit Low (SENT position sensor)	P02E8	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	==1.00 >11.00 [V] TPS_SENT_OOR_Flt == FALSE TPS_SENT_PerfFlt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT out of range and SENT performance	==1.00 >11.00 [V] TPS_SENT_OOR_Flt== FALSE TPS_SENT_PerfFlt== FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on Throttle DC Motor current range/performance	TPS_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Exhaust Gas Recirculation Current Performance	P034F	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range HP EGR position closed loop control active (no faults present on HP EGR position sensor, HP EGR flap, HP EGR position control deviation) HP EGR position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold (calculated with a table ECT/OAT) OR	==TRUE == 1.00 >11.00 [V] EGR_PstnSnsrFlt ==FALSE EGR_ActrFA==FALSE EGR_VlvStkOpenTFTKO ==FALSE <160.00 [%/s] >-160.00 [%/s] for >=0.40 [s] >=0.00 [°C]	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit Low	P037A	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to ground.	Test performed by HWIO. Aground short condition shall be detected if the circuit attached to the controller external connection has an impedance R to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The short to ground faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	R = 0.5 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Ground short monitoring is implemented in HWIO which means no further debouncing is needed in case of short to ground	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit High	P037B	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to high voltage.	Test performed by HWIO. A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance R to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R = 0.5 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	5.00 failures out of 8.00 samples Sampling rate: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit/Open	P0381	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin open circuit.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance Ropendet and shall not be detected if the circuit impedance is less than the Ropmin. The open circuit faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	Ropendet = 300 Q Ropmin = 10 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Open load monitoring is implemented in HWIO which means no further debouncing is needed in case of open load	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Performance	P0404	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	>16.00 [%]	Cold Start strategy NOT enabled	==TRUE	1,260.00 fail counts out of 1,600.00 sample counts 1,260.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips
					Test enabled by calibration	==1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=55.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>-15.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					HP EGR position setpoint in steady state conditions for minimum time	>-160.00 [%/s] <160.00 [%/s] for >=0.10 [s]		
					HP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq== FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage	P0405	This monitor checks if the HP EGR position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	==1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage	P0406	This monitor checks if the HP EGRposition analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration	==1.00	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	ECM determines that the EGR temperature Sensor 2 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of amount of engine consumed following a long enough soak, the Down Stream Temperature sensor has not change enough.	ABS(Initial Down stream temperature - final down stream temperature)<= **Down Stream Stk Temp Vrtn** [C°]	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 sec P262B	cumulative Time > 11.00 continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 159.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 885.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Intermittent/ Erratic	P040E	Detects a temperature sensor that is showing erratic or intermittent temperature readings	The absoluted value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 25.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 30 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Range/ Performance	P041B	ECM determines that the EGR temperature Sensor 1 has not moved enought since start (Stuck)	ECM determines that after an allowed amount of engine consumed airflow following a long enough soak, the Up Stream Temperature sensor has not change enough.	ABS(Initial upstream temperature - final upstream temperature) <= **UP Stream Stk Temp Vrtn** [C°]	System supply voltage Engine soak (not run) time No Active DTCs Engine is running	> 11.00 Volts >= 28,800.00 sec P262B	cumulative Time > 4.00 continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 164.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 860.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	10 failures out of 20 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings	The absoluted value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 25.00 Q impedance	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 30 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor detects the HP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR position > maximum threshold	>6.00 [%]	P0404 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	 >2.00 [s] EGR_PstnShtOffReq == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Exceeded Learning Limit	P049D	This monitor checks if the HP EGR position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	analog position raw voltage when the valve is in fully closed position < low threshold OR analog position raw voltage when the valve is in fully closed position > high threshold	< 15.00 [%5V] OR > 26.00 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - valve is in fully closed position (measured position smaller than a threshold); - difference between max and min learned values is smaller than a threshold. Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, HP EGR position deviation End Of Trip event has elapsed	==1.00 >= 70.00 [°C] <= 70.00 [°C] ECT_Sensor_FA == FALSE < 100.00 [%] < 100.00 [%] > 5.00 [V] EGR_PstnShtOffReq == FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR "A" Control Temperature Too High	P04FA	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring Low	P0545	Controller specific output driver circuit diagnoses t the exhaust gas temperature 1 (EGT1) sensor signal 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.	< 158 [Ohm]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring High	P0546	Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 1 (EGT1) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 900 [Ohm]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Initial Position Exceeded Learning Limit (VGT Smart)	P100B	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at End Of Line during the learning procedure is plausibile	physical travel measured at End Of Line < low threshold OR physical travel measured at End Of Line > high threshold	<217.00 [counts] OR >285.00 [counts]	Test enabled by calibration End Of Line Learning procedure at key off has been successfully completed End Of Trip event has elapsed No fault validated on smart VGT rolling counters	==1.00 CFM_VGT_CommFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Rail Pressure deviation during cut off	P1089	This diagnosis is able to check if, during SQA learning, the pressure set-point requested by SQA is correctly reached and maintained (in rail pressure range defined for SQA), in order to allow SQA to perform the learning.	Fuel Rail pressure	> SQA Rail Pressure Set-point + **KaFADC_p_SQA_LrnDelt** OR < SQA Rail Pressure Set-point - **KaFADC_p_SQA_LrnDelt**	Test enabled by calibration All enabling conditions for SQA learning different from Rail Pressure in range are satified Calibrateable delay time since SQA started to request rail pressure set-point has expired.	1.00 FAD_SQA_LrnPresEnbl 3,500.00	800.00 Fail Samples over 1,143.00 samples. 1 Sample every 12,5ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Performance	P10D5	This monitor checks if the CAC down air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler down air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Enablement calibration set to TRUE	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	>=1.00 [s]		
					Runk Crank Relay voltage in range	>11.00 [V]		
					The engine has not run for a calibratable time since last key off	>=28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature sensor			
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	<7.11 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	>753,016.00 [ohm]	Test enabled by calibration	==1.00	20.00 fail counter over 24.00 sample counter	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	> 11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	==1.00 >11.00 [V] CIT_CAC_DwnCktFA ==FALSE	40.00 fail counter over 50.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 plausibility at key on monitoring	P113B	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 1 (EGT1) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) - EGT1 temperature! in case of parking heater present 0.00 the threshold	> 30 [°C] > 30.00	Test enabled by calibration and with Battery voltage and with No Active DTCs No elettic puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Minimum number of sensor available for calculation Ambient Temperature	1 [Boolean] > 11.00 [V] EGT_ExhGas1_CktTFTKO ==TRUE == TRUE > 28,800.00 [sec] >=4 >-10.00 2.00	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 plausibility at key on monitoring	P113C	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 2 (EGT2) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) - EGT2 temperature! in case of the parking heater present the 0.00 threshold	> 25 [°C] >25.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with No Active DTCs No elettic puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Minimum number of sensor available for calculation	1 [Boolean] > 11.00 [V] EGT_ExhGas2_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4 >-15.00 2.00	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Ambient Temperature with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 plausibility at key on monitoring	P113D	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 3 (EGT3) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) - EGT3 temperature! in case of parking heater present 0.00 the threshold	> 20 [°C] > 20.00 [°]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with No Active DTC No eletrical puntual error and with **Reference temperature calculation done:** - key on and with - minimum engine-off time and with - Number of sensor available for calculation Ambient Temperature	1 [Boolean] > 11.00 [V] EGT_ExhGas3_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4 > -20.00 2.00	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 plausibility at key on monitoring	P113E	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 4 (EGT4) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) - EGT4 temperature! in case of parking heater present 0.00 the threshold	> 20 [°C] > 20.00 [°]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with No Active DTCs and with No eletrical puntual error Reference temperature calculation done: - key on and with - minimum engine-off time and with - Number of sensor available for calculation Ambient Temperature	1 [Boolean] > 11.00 [V] EGT_ExhGas4_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4 > -20.00 2.00	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 plausibility at key on monitoring	P113F	This diagnosis verify if, at key on, the temperature value read by exhaust gas temperature 5 (EGT5) sensor is almost equal to the reference temperature. Reference temperature is calculated as average value among all the available systemtemperature sensors(exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensor used for the average calculation shall be at least 4 but which sensor to use is calibratableand the sensor should not be faulted. The reference temperature is calculated at the system start up after a calibratable engine stop when all the temperature are supposed to be similar.	|Reference temperature at system cold start up (EGT_Avg) - EGT5 temperature! in case of parking heater present 0.00 the threshold	> 20 [°C] > 20.00 [°]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with No Active DTCs and with No eletrical puntual error and Reference temperature calculation done: - key on and with - minimum engine-off time and with - Number of sensor availablefor calculation Ambient Temperature with hysteresis	1 [Boolean] > 11.00 [V] EGT_ExhGas5_CktTFTKO ==TRUE ==TRUE > 28,800.00 [sec] >=4 > -20.00 2.00	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time No electrical fault detected on Soot Sensor If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass Ambient Air pressure Ambient air pressure sensor not faulty Time since Soot Sensor heating off when the sensor temperature has	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 9.00 V > 0.10s NOT(SOT_ElecIFlt) TPTKO on SOT_SnsrTempCktHiErr TPTKO on SOT_SnsrTempCktLoErr >70.00 KPa AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 600.00 s	No time debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					been stored is			
					Timer since Soot Sensor heating off is not affected by error on module off timer	NOT(ModuleOffTimeErr)		
					Calculation of the reference temperature at system start up is valid:	EGT_TempAvgVld		
					Minimum time from the previous key off to enable the reference temperature calculation	>28,800.00		
					Diagnostic has not yet reported a pass or failure	NOT (TPTKO OR TFTKO) on P118B		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1	P118E	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT1 - Modeled EGT1)> (Measured EGT1 - Modeled EGT1)<	204.00 degC OR -170.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT1_DiagMdlFlt and Engine Off Timer and EGT1 Model Temperature and EGT1 Model Temperature and Dynamick check Valid and No faults on the consumed EGT sensors	1.00 > 11.00 Volts == FALSE > = 0.00 seconds > 130.00 degC < 796.00 degC ==TRUE EGT_ExhGas1_StkFA and EGT_ExhGasI_StkTFTKO and EGT_ExhGas1_CktFA and	6.00 fail samples out of 8.00 Each sample is 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and	EGT_ExhGas1_CktTFTK0 and EGT_ExhGas2 QckChgFA and EGT_ExhGas1_QckChgTFTKO		
					Time since last DPF regeneration	>=900.00 seconds		
					and			
					Time after warm up	>= 90.00 seconds		
					and			
					Continues engine run time	>= 210.00 seconds		
					and			
					Fuel Rate and Engine Speed within bounds, determined by calibration map	**EGT1 DynChk EngPtEnbl**		
					and			
					Model Temperature Rate of change limited to:	17.00 degC		
					over a time period of:	CeEGTR_e_IndexMax5000ms		
					Enabling delay time	4.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2	P118F	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	(Measured EGT2 - Modeled EGT2) > (Measured EGT2 - Modeled EGT2) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT2_DiagMdlFlt and Engine Off Timer and EGT2 Model Temperature and EGT2 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds > 62.00 degC < 898.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults on the consumed EGT sensors	EGT_ExhGas2_CktFA and EGT_ExhGas2_CktTFTK 0 and EGT_ExhGas2_QckChgF A and EGT_ExhGas2_QckChgT FTKO and EGT_ExhGas2_QckChgF A		
					and			
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continues engine run time	>= 210.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	 **EGT2 DynChk EngPtEnbl** < 15.00 degC CeEGTR_e_IndexMax5000ms 4.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3	P1196	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT3 - Modeled EGT3) > Measured EGT3 - Modeled EGT3) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT3_DiagMdlFlt and Engine Off Timer and EGT3 Model Temperature and EGT3 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds >62.00 degC < 898.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults on the consumed EGT sensors	EGT_ExhGas3_CktFA and EGT_ExhGas3_CktTFTK 0 and EGT_ExhGas3_QckChgF A and EGT_ExhGas3_QckChgT FTKO and EGT_ExhGas3_StkFA and EGT_ExhGas3_StkTFTK 0		
					and			
					Time since last DPF regeneration	>= 900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continues engine run time	>=210.00 seconds		
					and			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fuel Rate and Engine Speed within bounds, determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	**EGT3 DynChk EngPtEnbl** <4.00 degC CeEGTR_e_IndexMax5000ms 4.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 4	P1197	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT4 - Modeled EGT4) > Measured EGT4 - Modeled EGT4) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT4_DiagMdlFlt and Engine Off Timer and EGT4 Model Temperature and EGT4 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 3,600.00 seconds >62.00 degC <898.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults on the consumed EGT sensors and	EGT_ExhGas4_CktFA and EGT_ExhGas4_CktTFTK0 and EGT_ExhGas4_QckChgFA and EGT_ExhGas4_QckChgTFTKO and EGT_ExhGas4_StkFA and EGT_ExhGas4_StkTFTK0		
					Time since last DPF regeneration	>=900.00 seconds		
					and			
					Time afert warm up	>= 90.00 seconds		
					and			
					Continues engine run time	>= 300.00 seconds		
					and			
					Fuel Rate and Engine Soeed within bounds,	**EGT4 DynChk EngPtEnbl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					determined by calibration map and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	<4.00 degC CeEGTR_e_IndexMax5000ms 4.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 5	P1198	This diagnosis compares the measured EGT to a model EGT when entry conditions permit. The difference between the values is averaged over a time window. After this time window has elapsed, the average difference is compared to a threshold. The result is then input to an X out of Y counter.	Measured EGT5 - Modeled EGT5) > Measured EGT5 - Modeled EGT5) <	100.00 degC OR -100.00 degC	Test Enabled by calibration and Battery Voltage and EGT_EGT5_DiagMdlFlt and Engine Off Timer and EGT5 Model Temperature and EGT5 Model Temperature and Dynamick check Valid and	1.00 > 11.00 Volts == FALSE > 0.00 seconds >62.00 degC <898.00 degC ==TRUE	6.00 fail samples out of 8.00 Each sample is 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults on the consumed EGT sensors and	EGT_ExhGas5_CktFA and EGT_ExhGas5_CktTFTK0 and EGT_ExhGas5_QckChgFA and EGT_ExhGas5_QckChgTFTKO and EGT_ExhGas5_StkFA and EGT_ExhGas5_StkTFTK0		
					Time since last DPF regeneration and	>=900.00 seconds		
					Time afert warm up and	>=90.00 seconds		
					Continues engine run time and	>= 210.00 seconds		
					Fuel Rate and Engine Speed within bounds, determined by calibration mao	**EGT5 DynChk EngPtEnbl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Model Temperature Rate of change limited to: over a time period of: Enabling delay time	 <4.00 degC CeEGTR_e_IndexMax5000ms 4.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit (SENT position sensor)	P122D	This monitor checks if the Throttle position SENT sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold	< 85.00 [%5V] OR > 94.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure enabled: - no faults present on engine coolant temperature sensor; - the engine coolant tempearture is in range. - outside air temperature above a threshold - no faults present on outside air temperature sensor Position control in closed loop: battery voltage above a threshold. No faults present on Throttle position sensor, Throttle valve, Throttle position deviation End Of Trip event has elapsed	==1.00 ECT_Sensor_FA == FALSE >= 70.00 [°C] <= 129.00 [°C] >=-10.00 [°C] OAT_PtEstFiltFA == FALSE > 5.00 [V] TPS_PstnShtOffReq== FALSE	1.00 fail counts out of 1.00 sample counts Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on HP EGR DC Motor current range/performance	EGR_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Shorted (ECB DC Motor)	P1413	This monitor checks if the HP EGR cooler bypass valve commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	>8 [A]	Test enabled by calibration	==1.00	106.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Current Range/ Performance (ECB DC Motor)	P1414	This monitor checks if an excessive current flows through the HP EGR cooler bypass DC-Motor (e.g. shunt circuit between load, HP EGR cooler bypass DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on HP EGR Cooler Bypass DC Motor current range/ performance H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V] CEB_MtrCurrLimTFTKO == FALSE	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Motor Overtemperature	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori IAT Not Plausible	P1428	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from MAT at powerup > 20 °C	Engine soak (not run) time No P codes Ambient Temperature with hysteresis	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119 > -20.00 0.00	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 IAT Not Plausible	P142A	The power up temperatue varies too much from reference sensor after long soak	if the power up initial value of the temp sensor varies more than allowed from the reference temp sensor	Temperature Delta from MAT at powerup > 20 °C	Engine soak (not run) time No P codes Ambient Temperature with hysteresis	>= 28,800.00 Sec P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119 >-20.00 0.00	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Supply Circuit (ECB DC Motor)	P1438	This monitor checks if the HP EGR cooler bypass DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low (SW 18.22 and beyond)	P144E	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring is divided into 2 logics, in particular the DPF warm up state logic, that has only the Positive deviation monitoring, and the DPF steady state logic, that has both deviation monitoring.	**Low Temperature monitoring (Positive Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	>100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Exhaust mass flow AND	1.00 [Boolean] DPF_DPF_St == WarmJJp EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] < 250.00 [g/s]	1,500.00 fail samples out of 1,850.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 30.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 10.00 [sec]		
			Low Temperature monitoring (Positive Deviation): Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 100.00 degC	Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	
					Regeneration state in Steady state DPF Mode	DPF_DPF_St== Steady_state		
					HCI temperature closed loop control shall be enabled	EGT_HC_CL_Enbl [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DPF upstream temperature sensor	EGT_SnsrDPF_UpFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_HC_ TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 30.00 [sec]		
					All the above enabling conditions met for at least a calibratable timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too High (SW 18.22 and beyond)	P144F	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF to determine whether the temperature deviation between the control setpoint and the temperature read by the sensoris within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is actived. The monitoring runs only in DPF steady state logic	**High Temperature monitoring (Negative Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	< -100.00 degC	Test shall be enabled by calibratable flag Regen eration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Exhaust mass flow AND	1.00 [Boolean] DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_HC_TempDeviation** [Boolean] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust mass flow	< 30.00 [sec]		
					Filtered Exhaust mass flow variation (absolute value)	> 10.00 [sec]		
					The system shall not be in cut off for a calibratable timer.			
					All the above enabling conditions met for at least a calibratable timer			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Supply Voltage Circuit High	P1473	This diagnosis detects a short to power on the soot sensor voltage supply line	{(ONLY VALID FOR HIGH OUT OF RANGE LIMIT: Soot Sensor control unit supply voltage) OR (ONLY VALID FOR LOW OUT OF RANGE LIMIT: Soot Sensor control unit supply voltage)}	> 17.30 OR < 8.40	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor ONLY VALID FOR LOW OUT OF RANGE LIMIT: Soot Sensor is in regeneration phase	 NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 11.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit Low	P1475	This diagnosis detects a short to ground on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit:		Soot Sensor Control Unit conditions:		Time counter:	Type B, 2 Trips
			Soot Sensor Electrode supply voltage	U <41.55 V OR U > 49.72 V	Soot Sensor Electrode Voltage ON		24.00 consecutive failures	
					ECU conditions:			
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
							100 ms/sample	
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P1473)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit High	P1476	This diagnosis detects a short to power on the soot sensor electrode supply line	Soot Sensor Electrode supply voltage	>2 V	Soot Sensor Control Unit conditions:		Time counter: 23.00 consecutive failures	Type B, 2 Trips
					Soot Sensor Electrode Voltage OFF			
					ECU conditions:			
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)	100 ms/sample	
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P1473)		
					IDE monitors that run during sensor regeneration have completed a report and 41 seconds had passed from that event (Diagnostic is enabled also prior the execution of the sensor regeneration)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	> 6.70	Soot Sensor bus relay is commanded on Soot Sensor is in measurement phase Soot Sensor Electrode current measurement enabled No electrical fault active on Soot Sensor bus relay No electrical fault detected on Soot Sensor Transmission fault with sensor control unit not present No faults of CAN communication loss with Soot Sensor Soot sensor is in measurement mode or Shunt circuit diagnostic mode has been triggered	NOT(SBR_RlyFA) NOT(SOT_EleclFlt) NOT(P30BC) NOT(U02A3)	No time debouce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Sensing Element Internal Supply Circuit High Voltage	P1497	This diagnosis detects internal errors to the IDE Supply voltage (SCU internal error)	IDE Supply voltage signal	>= 4.7 V	- Soot Sensor Control Unit conditions: No conditions - ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 9.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Control Module Internal Supply Voltage Circuit	P1498	This diagnosis detects internal errors to the sensor Supply voltage (SCU internal error)	Sensor supply voltage (SRC Low voltage threshold) OR Sensor supply voltage (SRC High voltage threshold)	< 1.1V > 4.9V	- Soot Sensor Control Unit conditions: No conditions - ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor	NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 4.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used) - (SW 18.19 and beyond)	P2002	This diagnosis detects a cracked Diesel Particulate Filter	{The predicted soot sensor filtered by using EWMA filter is} OR {The predicted soot sensor filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	<1.07 < 1.07 DPF_DPF_EffMontrFA = 1 (true)	Test enabled by calibration (TRUE-> enable FALSE -> disable) Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor and faults which inhibit sensor to stay in measurement Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature During sensor measurement phase, Number of Autostop events During sensor	1.00 > 0.00 s NOT (SOT_SootSnsrFlt) NOT (EXM_PM_TurbFlowNotRl b) SOT_ExhTempSootSnsrV ld SOT_TotExhSootSnsrVld NOT (SOT_PM_DPF_UpFlt) > -20.00 °C < 20.00	Test per Trip: 1: If Fast Initial Response (FIR) mode is active then 2.00 test per trip are allowed If Rapid Response (RR) mode is active then 2.00 test per trip are allowed The signal for the monitor check is filtered by means a first-order filter. The filter step change can assume the following values: - 0.81 if FIR is active - 0.11 if RR is active - 0.04 if neither FIR and RR are active Initial filter value: -1.08 when FIR is activated - 1.13 when RR is activated	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					measurement phase, Duration of Autostop phase During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is If EWMA filter is enabled (TRUE—> enable FALSE -> disable) AND number of diagnostic run for driving cycle is EGR rate signal is valid	< 200.00 s <=150.00 1.00 =1 (true) < 1 (when FIR and RR are not active) < 1.00 (when FIR is active) < 1.00 (when RR is active) NOT (INM_EGR_RateNotVld)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Over Temperature Bank (DOC1_SCR_DOC2_DPF)(EGT5)	P200C	This diagnosis verify if the exahust gas temperature on DPF Downstream (EGT_DPF_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Downstream Exhaust gas temperature	***In Regeneration mode:*** >800.00 [°C] **In Normal mode:** > 800.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on DPF Downstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	**In Normal mode:** 300.00 fail samples out of 450.00 samples **In Regeneration mode:** 300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Downstream Exhaust gas temperature	> 900.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault on DPF Downstream Temperature sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Over Temperature Bank 1 (DOC1_SCR_DOC2_DPF) (EGT2)	P200E	This diagnosis verify if the exahust gas temperature on ccDOC Downstream (EGT_DOC1_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** Exhaust gas temperature on ccDOC Downstream	**In Regeneration mode:** > 800.00 [°C] **In Normal mode:** > 800.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream Temperature sensor (EGT2)	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	**In Normal mode:** 300.00 fail samples out of 450.00 samples **In Regeneration mode :** 300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: Exhaust gas temperature on ccDOC Downstream	> 900.00	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature sensor (EGT2)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring Low	P2032	Controller specific output driver circuit diagnoses t the exhaust gas temperature 2 (EGT2) sensor signal 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.	< 158.00 [Ohm]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring High	P2033	Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 2 (EGT2) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 900.00 [Ohm]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 quick change monitoring	P2081	This diagnosis verify if the EGT1 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT1 output reistance - EGT1 output resistance old|	> 10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with Battery voltage and with key on and with No electrical faults on EGT1 sensor in and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas1_TFTKO and with EGT_ExhGas1_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 quick change monitoring	P2085	This diagnosis verify if the EGT2 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT2 output reistance - EGT2 output resistance old|	>10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical faults on EGT2 sensor in and logic	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGT_ExhGas2_TFTKO and with EGT_ExhGas2_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit/Open	P20CB	This diagnosis detects a HC Injector Command pin /wire in open circuit	HC injector HWIO Open interface fault	=TRUE (i.e. If the voltage at the AUXINJ output in the OFF state stays below Volt (1.95 to 2.175V) and Volt (2.9 V to 3.2 V) for a time longer than tdiag (40ps to 70ps)	Test Enabled by calibration Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;	1.00	48.00 failures over 60.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit Low	P20CD	This diagnosis detects a HC Injector Command pin /wire shortcut to ground	HC injector HWIO Short To Ground interface fault Note: If DTC failed, it will be healed only after a calibratable counter 1,000,000.00 or after ECU Reset event	=TRUE (i.e If the voltage at the AUXINJ output in the OFF state stays below Vltvt (1,95V to 2,175V) for a time longer than tdiag (40ps to 70ps)	Shared High Side Driver 2 commanded ON (i.e. closed) Powertrain relay voltage in range;		10.00 failures over 20.00 samples 100 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit High	P20CE	This diagnosis detects a HC Injector Command pin /wire shortcut to power supply	HC injector HWIO Short To Power Supply interface fault	=TRUE (i.e. If the current through the AUXINJ output in the ON state is higher than Ioci (8Ato 11A) for a time longer than toc1 = 36ps OR If the current through the AUXINJ output in ON state is higher than Ioc2 (16 A to 22A)	Powertrain relay voltage in range;		48.00 failures over 60.00 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	This DTC aims to detect a drift of measured 02 value (A) from an estimated concentration (B) when the latter can be considered stable during overrun condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 1.50 [%] < -1.60 [%]	Engine running System voltage in range Sensor is fully operative No SQA learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_N Ox1_O2_RawN ot Rib == FALSE FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1 OvrnC hkCmbModeEnbl**) < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdl Fit OXY_NOx1SignRngChkFI t FHPJnjLeakageFA EGR_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) (MAP_SensorFA AND	Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 3.50 [s]		
					a. Engine speed in operating range	> 600 [rpm] < 3,000 [rpm]		
					b. EGR position	< 5.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 2,500.00 [mg]		
					Estimated 02 concentration stable i.e. difference between initial and actual value	< 0.50 [%]		
					Air mass flown since fuel cut-off condition	> 40.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 2	P22B6	This DTC detects if 02 signal is lower than physical minimum value.	02 signal lower than a minimum value	< -4.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx2_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx2SigRn (gEnblCmbMode**) NOX_Snsr2_NotVld	Time counter: 200 failures out of 250 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 2	P22B7	This DTC detects if 02 signal is higher than physical maximum value	02 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs		Time counter: 100 failures out of 200 samples. Time task 25 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Out of Range During Deceleration Bank 1 Sensor 2	P232F	This DTC aims to detect a drift of Sensor 2 02 measured value (A) from Sensor 1 02 measured value (B) when the latter can be considered stable during overrun condition.	EWMA filtered error (A - B) in overrun condition is out of plausible range	> 3.01 [%] < -3.18 [%]	Engine running System voltage in range Sensor is fully operative Sensor 1 is fully operative No pending or confirmed DTCs DTC P2297 is running Air mass flown since P2297	> 11.00 [V] OXY_O2_NOx2_PresCmpNotRIb ==FALSE 0XY_02_N0x1_PresCmpNotRIb == FALSE NOX_Snsr2_NotVld (MAF_SensorFA AND MAF_SensorTFTKO) OXY_NOx1_O2_Flt OXY_NOx2SignRngChkFIt N0X_Snsr2_PresFlt (see P2297 Fault code) > 30.00 [g]	EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring Low	P242C	Controller specific output driver circuit diagnoses t the exhaust gas temperature 3 (EGT3) sensor signal 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.	<158.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring High	P242D	Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 3 (EGT3) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. 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.	> 900.00 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] ==TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 quick change monitoring	P242E	This diagnosis verify if the EGT3 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT3 output reistance - EGT3 output resistance old|	>10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical faults on EGT3 sensorin and logic	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGT_ExhGas3_TFTKO and with EGT_ExhGas3_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Differential Pressure Too Low - (SW 18.19 and beyond)	P244A	This diagnostic detects a DPF pressure sensor pipe disconnected or clogged or blocked or a removed Diesel Particulate Filter	measured DPF absolute pressure	< **Exhaust Gas Pressure Too Low Threshold**	Test enabled by calibration (TRUE-> enable FALSE -> disable) No error on relative to ambient pressure sensor (electrical, rationality and offset) No error on upstream DPF temperature sensor (electrical and rationality) No error on air flow meter No error on atmospheric pressure sensor Exhaust gas volume flow Engine speed (Engine coolant temperature OR OBD Coolant Enable Criteria) Pipe Icing Risk Low	1.00 EGP_DiffPresSnsrRatFlt EGT_SnsrDPF_UpFlt MAF_MAF_SnsrFA OR MAF_MAF_SnsrTFTKO AmbPresDfltdStatus= CeAAPR_e_AmbPresNotDfltd > 125.00 l/s > 800.00 rpm > 40.00 °C OR = TRUE) ==TRUE	60.00 failures over 120.00 samples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter pressure sensor offset monitoring - 18.21	P2452	This diagnosis verify if the pressure at the DPF inlet measured at the beginning of the driving cycle (when engine is not running), is too big (sensor offset too big)	|Average DPF pressure (©beginning of driving cycle|	2 [%]	Test enabled by calibration and with key on and with minimum engine-off time and with Minimum engine not No fault on engine off Timer and with Pipe Icing Risk Low No fault on exhaust gas pressure sensor (electrical, quick change and stuck in range in and logic)	1 [Boolean] ==TRUE >21,600.00 [sec] > 0.02 [sec] **EMD_EngModeNotRunTmErr** ==TRUE Units: [-] EGP_DiffPresQckChgFlt and with EGPJDiffPresSnsrCktFlt and with EGP_DiffPresSnsrRatFlt	No debounce Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter pressure sensor plausibility monitoring - 18.21	P2453	Casel: This diagnosis verify if the current value of the flow resistace is almost equal to the average value of the flow resistance Case2: This diagnosis verify if the pressure at the DPF inlet doesn't change when it is supposed to change (when moving from one engine operating point to another)	|Flow resistance filtered - Average flow resistance|>	> 0.02 [KPa*s/m^3]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No fault on exhaust gas pressure sensor (electrical, offset, quick change and stuck in range in and logic) and with No fault on air flow meter in and logic and with No fault on DPF Upstream temperature	0 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V] EGPJDiffPresOfstTFTKO and with EGPJDiffPresQckChgFlt and with EGP_DiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent MAF_SensorFA and with MAF_SensorTFTKO EGT_SnsrDPF_UpFA and with	40 fail samples out of 80 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor (electrical, rationality, quick change and stuck in range in and logic) and with **System in stationary conditions:** - Fuel request and with - Engine speed and with - Air mass quantity per cylinder and with - Air mass quantity per cylinder and with - Deactivation of Flow resistance calculation	EGT_SnsrDPF_UpTFTK 0 <=1.00 [mm^3] <=10.00 [rpm] <= 10.00 [mg] >0.00 [mg] == FALSE		
			DPF pressure variation	<= 0.15[%]	Test enabled by calibration and with Engine running and with No fault on exhaust gas pressure sensor (electrical, plausibility,	1 ==TRUE EGP_DiffPresOfstTFTKO and with EGP_DiffPresQckChgFlt	11 fail samples out of 15 samples Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					offset and quick change in and logic)	and with EGPJDiffPresSnsrCktFlt and with EGP_DiffPresStkFltPresent		
					and with			
					Engine speed variation greater	>300.00 [rpm/s]		
					and with	==TRUE Units: [-]		
					Pipe Icing Risk low	>20.00 [l/s]		
					Fuel quantity variation greater			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter pressure sensor out of range monitoring Low - 18.19	P2454	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal s 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.	< 3.00 [%]	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	90 fail samples out of 180 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter pressure sensor out of range monitoring High - 18.19	P2455	Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal 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. Controller specific output driver circuit diagnoses the relative to ambient pressure sensor signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	90 fail samples out of 180 samples Function task: 12.5 ms	Type A, 1 Trips
			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.	> 97.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage	1 [Boolean] == TRUE == FALSE ==TRUE > 11.00 [V]	90 fail samples out of 180 samples Function task: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter pressure sensor quick change monitoring - 18.19	P2456	This diagnosis verify if the signal (difference between two consecutive signal samples) variation is too big	|DPF pressure raw signal - DPFpressure raw signal old|	> 20.00 %	Test enabled by calibration and with Engine running and with Engine cranking and with key on and with Battery voltage and with No electrical fault on exhaust gas pressure sensor	1 [Boolean] == TRUE == FALSE == TRUE > 11.00 [V] EGPJDiffPresSnsrCktFlt	40 fail samples out of 170 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (non-MDE applications)	P2457	This monitor checks the HP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	HP EGR Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. HP EGR Cooler efficiency is computed as the ratio between (HP EGR cooler upstream temperature - HP EGR cooler downstream temperature) and (HP EGR cooler upstream temperature - Engine coolant temperature).	< 74.00 [%]	Calibration on diagnostic enabling	1.00 ==TRUE	Test executed after 150.00 samples are collected and their average is computed	Type B, 2 Trips
					Diagnostic has not run in current driving cycle yet	==TRUE		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]	functional task 100 ms	
					Engine is running or cranking	==TRUE		
					HP EGR cooler upstream temperature in range	>95.00 [°C] <850.00 [°C]		
					Ambient Temperature	>=-12.00 [°C]		
					Ambient pressure	>=69.60 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>70.00 [°C] ==TRUE <130.00 [°C]		
					HP EGR Cooler bvpass	>8.00 [si		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					not active for a time			
					Time after combustion mode change	>0.00 [s]		
					HP EGR filtered flow in range	< **P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s] > **P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s]		
					for a time	>= **P2457: Minimum time for HP EGR cooler efficiency monitor enabling** [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	<3,100.00 [rpm] >560.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR	GET_DNSS_FA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					cooler downstream temperature sensor			
					No fault on Ambient Temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		
					No fault on HP EGR Cooler Bypass	CEB_ActrCktLoFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Regeneratio n Frequency - SW 18.21 w/ EWMA filter	P2459	This diagnostic detects a too high DPF regeneration frequency due to inefficient combustion, inefficient regeneration, soot overestimated by models or leaks in the exhaust or the intake line. When a new regeneration is started, the diagnostic computes a ratio between the soot level estimated by the model that has triggered the regeneration and the soot level estimated by the Nominal Engine Out soot model, which gives information about the expected soot level in the DPF. If the ratio is greater than a threshold, the diagnostic will report a fail. In case the regeneration is started based on miles travelled or time passed since last regeneration, the diagnostic will always report a pass. The test results can be optionally filtered by an EWMA filter.	When the regeneration is started by a soot model, the ratio between the soot level from that model and the soot level estimated by the Nominal Engine Out model is calculated. Monitor configuration: *EWMA Enable* = 1.00 **a)** In case of EWMA filter not enabled *(EWMA Enable* == 0), the calculated ratio is **b)** In case of EWMA filter enabled *(EWMA Enable* == 1), the calculated ratio is OR, if a P2459 fault is already active, the calculated ratio is	 > 14.94 > 14.94 > 14.94	Test enabled by calibration A new DPF regeneration is started At least one successful regeneration has already occurred The previous regeneration was completed successfully The regeneration is requested at service Just before the new regeneration is started, Delta Pressure (Ap) soot model was valid for a time (*) Delta Pressure (Ap) plus Configurable Correction Block (CCB) soot model was valid for a fraction of the soot loading time (*) The Nominal Engine Out soot model was valid for a fraction of the soot loading time (**)	1.00 == TRUE == TRUE == TRUE == FALSE >= 0.00 s >=0.20 >=0.20	No time required, the malfunction criteria are evaluated as soon as a new DPF regeneration is started. Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/crank voltage	>11.00V		
					Extreme transient engine operation was not detected, i.e. the delta fuel request during the soot loading time was	< 255.00 mm3/s		
					(*) Condition is ignored if the regeneration is not triggered by this model			
					(**) Condition is ignored if the regeneration is started based on miles or time since last regeneration			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit (ECB DC Motor)	P245A	This monitor checks if the HP EGR cooler bypass valve commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P245B	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy NOT enabled Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation) HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time Engine coolant temperature higher or	==TRUE ==1.00 >11.00 [V] CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE <160.00 [%/s] >-160.00 [%/s] for >=0.40 [s] >=55.00 [°C]	1,280.00 fail counts out of 1,600.00 sample counts 1,280.00 fail counts to enable the open circuit check (P245A) Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-15.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Soot Accumulation-(SW 18.19 and beyond)	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 140.00	Test enabled by calibration (TRUE-> enable FALSE -> disable)	1.00	120.00 failures over 150.00 samples function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt		
					No fault on upstream DPF temperature sensor (electrical and rationality)	EGT_SnsrDPF_UpFlt		
					No fault on air flow meter	MAF_MAF_SnsrFAOR MAF_MAF_SnsrTFTKO		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					DPF status insootloading phase (no regeneration ongoing)	DPF_DPF_St== CeDPFR_e_SootLoading		
					Engine speed	> 600.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA		
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 60.00 [l/s] for> 2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	0.00 [DegC] < Temperature < 700.00 [DegC] for >5.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine Coolant Temperature	> -40.00 [DegC]		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 0.20 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 5.00 s		
					Distance since last completed regeneration	> 0.00 km		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring Low	P2470	Controller specific output driver circuit diagnoses t the exhaust gas temperature 4 (EGT4) sensor signal 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.	<158 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE >11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring High	P2471	Controller specific output driver circuit diagnoses the exhaust gas temperature 4 (EGT4) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 4 (EGT4) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips
			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.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 quick change monitoring	P2472	This diagnosis verify if the EGT4 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT4output reistance - EGT4 output resistance old|	>10.00 [Ohm]	Test enabled by calibration	1 [Boolean]	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips
					and with			
					Engine running	== TRUE		
					and with			
					Engine cranking	== FALSE		
					and with			
					Battery voltage	> 11.00 [V]		
					and with			
					key on	== TRUE		
					and with			
					No electrical faults on EGT4 sensorin and logic	EGT_ExhGas4_TFTKO and with EGT_ExhGas4_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring Low	P2481	Controller specific output driver circuit diagnoses t the exhaust gas temperature 5 (EGT5) sensor signal 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.	< 158 [Ohm]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring High	P2482	Controller specific output driver circuit diagnoses the exhaust gas temperature 5 (EGT5) signal 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. Controller specific output driver circuit diagnoses the exhaust gas temperature 5 (EGT5) signal 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 short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips
			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.	> 900 [Ohm]	Test enabled by calibration and with Engine cranking and with Battery voltage and with key on	1 [Boolean] == FALSE > 11.00 [V] == TRUE	10 fail samples over 20 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 quick change monitoring	P2484	This diagnosis verify if the EGT5 temperature sensor signal (difference between two consecutive signal samples) variation is too big	|EGT5 output reistance - EGT5 output resistance old|	>10.00 [Ohm]	Test enabled by calibration and with Engine running and with Engine cranking and with Battery voltage and with key on and with No electrical faults on EGT1sensorin and logic	1 [Boolean] == TRUE == FALSE > 11.00 [V] == TRUE EGT_ExhGas5_TFTKO and with EGT_ExhGas5_FA	15 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit Low (analog position sensor)	P2494	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit High (analog position sensor)	P2495	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop DPF Regeneration Control At Limit - Temperature Too Low (SW 18.22 and beyond)	P24A0	DPF Control Temperature Deviation diagnostic monitors diagnostic mthe exhaust gas temperature onitordsownstream the 1st ccDOC to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic.	**LowTemperature monitoring (Positive Deviation):** **(c1)** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	>100.00 degC	Test shall be enabled by calibratable flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow **(c1)** No Fault on ccDOC Downstream temperature sensor **(c2)** No Fault on DPF Upstream temperature sensor Combustion mode different from LNT Desox Lean and LNT Engine Protection Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine	1.00 [Boolean] DPF_DPF_St== Warm_Up EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] EGT_SnsrCatDwnFlt [Boolean] EGT_SnsrDPF_UpFlt [Boolean] **EnginePointEnable_DPF _TempDeviation** [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					speed and fuel request			
					Exhaust mass flow AND	< 250.00 [g/s]		
					Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					The system shall not be in cut off for a calibratable timer.	< 30.00 [sec]		
					No fault on ambient temperature sensor (only SCR forward architecture)	OAT_PtEstFiltFA		
					No fault on ambietnt pressure sensor (only SCR forward architecture)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTKO		
					All the above enabling conditions met for at least a calibratable timer	> 40.00 [sec]		
			Low Temperature monitoring (Positive Deviation):		Test shall be enabled by calibratable flag	1.00 [Boolean]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream	>100.00 degC	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			sensor reading (EGT2) (c2) Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)		DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					(c1) No Fault on ccDOC Downstream temperature sensor	EGT_SnsrCatDwnFlt [Boolean]		
					(c2) No Fault on DPF Upstream temperature sensor	EGT_SnsrDPF_UpFlt [Boolean]		
					Combustion mode different from LNT Desox Lean and LNT Engine Protection			
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF_TempDeviation** [Boolean]		
					Exhaust mass flow AND	< 250.00 [g/s]		
					Exhaust mass flow	> 8.00 [g/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					The system shall not be in cut off for a calibratable time	< 30.00 [sec]		
					No fault on ambient temperature sensor (only SCR forward architecture)	OAT_PtEstFiltFA		
					No fault on ambietnt pressure sensor (only SCR forward architecture)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTKO		
					All the above enabling conditions met for at least a calibratable timer	> 15.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Stuck (ECB DC Motor)	P24A5	This monitor detects the HP EGR Cooler Bypass mechanically stuck in a certain position different from its defaulted position (fully closed, cooling mode) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR Cooler Bypass position > maximum threshold (not cooling position)	>15.00 [%]	P245B is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the vanes in their defaulted position) Diagnostic system enabled (no clear code or EOT in progress) HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	 > 1.00 [s] CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Range/ Performance	P24AF	This diagnosis detects a soot sensor memory corruption	Soot sensor state machine command (ECM) is different from SCU feedback		Soot Sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Transmission fault with sensor control unit not present Soot sensor state machine command is different from initialization state or error state Time between states transition	> 1.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P30BC) > 3.10	Time counter: 160.00 failures out of 200.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 1.30	Soot Sensor is in regeneration phase		No time debounce	Type B, 2 Trips
					Soot Sensor bus relay is commanded on			
					Soot Sensor Electrode current measurement enabled			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No Electrical faults present on Soot Sensor	NOT(SOT_EleclFlt)		
					Transmission fault with sensor control unit not present	NOT(P30BC)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					Sensor is commanded in a regeneration state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit High	P24B1	This diagnosis detects a short to power the soot sensor electrode signal	Soot Sensor Electrode supply voltage (measured ADC voltage for electrode current)	>4.1 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply IDE Temperature is lower than In case of overthreshold event the diagnostic will be re-enabled by passing (hysteresis)	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473) 550.00 500.00	Time counter: 24.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit Low	P24B5	This diagnosis detects a short to ground on the soot sensor heater line	Soot Sensor Heater current Number of SCG error events	1< 0.5 A OR 1> 15A > 100	<u>Soot Sensor Control Unit conditions:</u> Soot Sensor Heater Commanded on, i.e., heater duty cycle <u>ECU conditions:</u> Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 9.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit High	P24B6	This diagnosis detects a short to power on the soot sensor heater line	Soot Sensor Heater output voltage OR Soot Sensor Heater switch input (off state) OR Soot Sensor Heater switch current in PWM OFF state	> 6 V in PWM OFF state = 1 0.5A < I < 15A	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Exceeded Learning Limit (analog position sensor)	P24C4	This monitor checks if the HP EGR cooler bypass position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (cooling position and bypass position)	analog position raw voltage when the valve is in cooling position < low threshold OR analog position raw voltage when the valve is in cooling position > high threshold OR analog position raw voltage when the valve is in bypass position < low threshold OR analog position raw voltage when the valve is in bypass position > high threshold	< 16.00 [%5V] OR > 24.00 [%5V] OR < 60.90 [%5V] OR > 91.40 [%5V]	Test enabled by calibration Learning procedure at key off in fully closed and fully open position has been successfully completed: - engine coolant in range; - no faults present on engine coolant temperature. No faults present on HP EGR cooler bypass position sensor, HP EGR cooler bypass valve, HP EGR cooler bypass position deviation End Of Trip event has elapsed	= 1.00 >= 70.00 [°C] <= 129.00 [°C] ECT_Sensor_FA == FALSE CEB_ActrFlt == FALSE CEB_PstnSnsrFlt == FALSE CEB_ObstructionTFTKO == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Matter Sensor Temperature Circuit Performance	P24C7	This diagnosis detects a soot sensor removed from the exhaust line, a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	>100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd AND NOT (VehicleSpeedSensor_FA	Time counter: 250.00 failures out of 255.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas temperature model is reliable, i.e.: (Ambient air pressure Ambient air temperature Exhaust gas volumetric flow at soot sensor) Time after sensor regeneration Temperature estimated by the sensor probe temperature model - Electrode temperature	) > 70.00 kPa > -20.00 °C > 50.00 mg/s >300.00 s OR > 100.00 °C > 0.00 °C NOT(P30BC) >0.00		

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

					Temperature estimated by the sensor probe temperature model - Outside air temperature
					
					Transmission fault with sensor control unit not present
					
					ONLY VALID FOR PM SENSOR DIFFERENT FROM 2.2:
					{
					Heating during measurement is not active or heater off condition
					}			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Circuit High	P24C9	This diagnosis detects a short to power or an open circuit on the soot sensor temperature signal	Voltage of Soot Sensor temperature meander (TM) signal Soot Sensor Temperature meander (TM) refernce voltage signal	< 0.3 V OR > 3.5 V <4.5 V	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Regeneratio n Incomplete	P24D1	This diagnosis detects a degradation of the soot sensor heater	the Soot Sensor Electrode Temperature is during the steady state soot sensor regeneration, for a consecutively time	<= (725.00-10.00)°C < 43.00 s	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Exhaust gas temperature is during all the regeneration phase Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is	NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) NOT(< 500.00) SOT_TotExhSootSnsrVld AND SOT ExhTempSootSnsrVld AND SOT_ExhPresSootSnsrVld < 5.00 s r <= 1.00 NOT(P30BC)	no debouncing time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Soot sensor transitioned from regeneration to measurement status Transmission fault with sensor control unit not present			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Exhaust Sample Error Bank 1	P24DA	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	Integrated derivative of corrected volumetric flow AND Integrated derivative of effective soot sensor heater voltage (i,e, cumulated heater voltage change)	> 5,000.00 < 10.21V	Key is turned on Ignition voltage in range Engine in running mode Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor No fault on exhaust gas pressure estimation at sensor location No fault on exhaust gas temperature estimation at sensor location No fault on gas mass flow estimation at sensor location Soot Sensor in protection heating operating state Derivative in volumetric flow	 > 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24DO) NOT(SOT_ElecIFlt) SOT_ExhPresSootSnsrVId SOT_ExhTempSootSnsrVId SOT_TotExhSootSnsrVld 3.00 < d2V < 100.00	No debounce time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time	>= 1.00s		
					At InitCntrlr time since engine off	> 28,800.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 22.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 0.00 s		
					Exhaust gas temperature at Soot Sensor	0.00 < T <200.00 °C		
					Environmental pressure	> 70.0 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 0.00 s		
						NOT(P30BC)		
					Transmission fault with sensor control unit not present			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge r VGT A Stuck Closed (VGT Smart)	P2599	This monitor detects the VGT vanes mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Position after P0046 has set > threshold	>25.00 [%]	P0046 is already set		No debounce is present: DTC sets as soon as the error is present Function task: 25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position)	>2.00 [s]		
					VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	VGT_PstnSnsrOfstFA ==FALSE VGTJSmartActrFA ==FALSE CFM_VGT_CommFA == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1	P2627	This DTC detects if 02 signal is lower than physical minimum value.	02 signal lower than a minimum value	< -4.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_N Ox1_O2_RawN ot Rib == FALSE refer to supporting table **KaOXYD_b_NOx1SigRn (gEnblCmbMode**) NOX_Snsr1_NotVld	Time counter: 200 failures out of 250 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 1	P2628	This DTC detects if 02 signal is higher than physical maximum value.	02 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_N Ox1_O2_RawN ot Rib == FALSE < 1,000.00 [kPa] < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injector Data Incompatible	P268C	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 1 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Data Incompatible	P268D	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 2 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injector Data Incompatible	P268E	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 3 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injector Data Incompatible	P268F	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 4 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injector Data Incompatible	P2690	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 5 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injector Data Incompatible	P2691	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 6 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injector Data Incompatible	P2692	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 7 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injector Data Incompatible	P2693	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 8 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise only report test fail if the MEC (Manufacturing Enable Counter) is zero.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Manufacturer Enable Counter (MEC) == 0	 1.00 [Boolean]	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Diesel Intake Air Flow A Control Performance	P2957	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	[Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature	==TRUE ==1.00 >11.00 [V] >=0.00 [°C] ECT_Sensor_FA ==FALSE >=-23.00 [°C] >= -23.00 [°C] OAT_PtEstFiltFA ==FALSE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					higher or equal to minimum threshold	>-160.00 [%/s] <160.00 [%/s] for >=0.40 [s]		
					Outside air temperature breakpoint for minimum engine coolant temperature enable			
					No faults present on outside air temperature sensor			
					Throttle position setpoint in steady state conditions for minimum time			
					Throttle position closed loop control active			
					No mechanical stop soft approach in progress			
					No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start TurbochargerVGTA Performance	P2958	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	> 16.00	Cold Start strategy enabled Test enabled by calibration System out of the cranking phase PT relay supply voltage in range VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation) VGT position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on	== TRUE == 1.00 > 11.00 [V] VGT_PstnSnsrFA ==FALSE VGT_ActCktFA ==FALSE VGT_PstnCntrlFA ==FALSE > -100.00 [%/s] < 100.00 [%/s] for >= 0.50 [s] >= 0.00 [°C] ECT_Sensor_FA ==FALSE	420.00 fail counts out of 520.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine coolant temperature sensor			
					Outside air temperature higher or equal to minimum threshold	>= -60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P2959	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation) HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time Engine coolant temperature higher or	==TRUE ==1.00 >11.00 [V] CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE <160.00 [%/s] >-160.00 [%/s] for >=0.40 [s] >=0.00 [°C]	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					equal to minimum threshold (calculated with a table ECT/OAT) OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC aims to detect a drift of measured 02 value (A) from an estimated concentration (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 1.50 [%] < -3.30 [%]	Engine running		Once per trip Note: if EWMA Fast Initial Response is active OR EWMA Rapid Response is active than multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_N Ox1_O2_RawN ot Rib == FALSE		
					Enabled in combustion mode	refer to supporting table (**KaOXYD_b_NOx1 LoadChkCmbModeEnbl**)		
					(No After injection release AND Boolean Flag used to enable After injection status is TRUE)	0 [boolean]		
					No pending or confirmed DTCs	NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1 PlausMdl Fit FHPJnjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid		
					Stable fuel cut-off condition has been reached i.e. following			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					conditions are met for a calibrateable time:	> 1.00 [s]		
					a. Engine speed in operating range	> 1,100 [rpm] < 2,000 [rpm]		
					b. EGR mass flow	< 1,000.00 [mg]		
					c. Injected fuel quantity in operating range	> 20.00 [mm^3] < 50.00 [mm^3]		
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 2,500.00 [mg]		
					Estimated 02 concentration stable i.e. difference between initial and actual value	< 1.00 [%]		
					Air mass flown since fuel cut-off condition	> 40.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 2	P2A01	This DTC aims to detect a drift of Sensor 2 02 measured value (A) from Sensor 1 02 measured value (B) when the latter can be considered stable during full load condition.	EWMA filtered error (A - B) in full load condition is out of plausible range	> 4.60 [%] < -2.76 [%]	Engine running		EWMA filtering: multiple tests per trip are allowed.	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRIb == FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRIb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A00 is running	(see P2A00 Fault code)		
					Air mass flown since P2A00 is enabled	> 30.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Motor Overtemperature (ECB DC Motor)	P2AA5	This monitor checks if the temperature of the HP EGR cooler bypass DC-Motor increases too much (e.g. HP EGR cooler bypass DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

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

Particulate Matter Sensor Processor Performance	P2AB0	This diagnosis detects internal errors to the current switcher (SCU internal error)	NOT
			{
			Soot Sensor Electrode current read in small range
			>=
			Minimum current value in small range
			
			AND
			
			Soot Sensor Electrode current read in small range
			<=
			Maximum current value in small range
			}
					Soot Sensor is in regeneration phase
					
					Soot Sensor bus relay is commanded on
					
					Soot Sensor Electrode current measurement enabled
					
					Soot Sensor Electrode current read in large range
					
					No Electrical Faults present on Soot Sensor
					
					No Electrical Fault Active on Soot Sensor bus relay
					
					Transmission fault with sensor control unit not present
					
					No faults of CAN communication loss with Soot Sensor
						{<=
						400.00
						
						AND
						
						>=
						1.40
						}
						
						NOT(SOT_ElecIFlt)
						
						NOT(SBR_RlyFA)
						
						NOT(P30BC)
						
						NOT(U02A3)
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Diesel Intake Air Flow "A" Position Sensor	U0654	This monitor checks if the Throttle position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO message fault on Throttle SENT position == TRUE OR	> 6.25 [ms] AND == STEADY LOW > 6.25 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 == TRUE > 11.00 [V] == TRUE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE)))	------------- AND > 6.25 [ms]				

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF EffRgnHysHi

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
5	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
10	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
15	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
20	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
25	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
30	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
35	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
40	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
45	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
50	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
55	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
60	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
65	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
70	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
75	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
80	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
90	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
100	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
5	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
10	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
15	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
20	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
25	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
30	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
35	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
40	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
45	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
50	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
55	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
60	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
65	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
70	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
75	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
80	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
90	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
100	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

Initial Supporting table - DPFResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	10	20	30	40	50	60	70	80
1	1	1	1	1	1	1	1	1

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT FuelReqMaxThreshold

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT FuelReqMinThrsh

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT1DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,199.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,200.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT2 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT4DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT4 Dynamic Check.

y/x	0.0	12.5	15.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT5DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT5 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	950	1,000	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
60	0	1	1	1	1	1	1	1

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	950	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmllp	CeCMBR_e_SoftExhGasWarmllp	CeCMBR_e_DPF_PN
1	0	0	1	1	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	0	0	

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

y/x	0	1	2	3	4	5
1	0	0	0	0	0	0

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	0	0	4	4	4	4	4	4

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CWA_DrvInGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp1 0	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: Mpa

y/x	0	1	2	3	4
1	5	5	5	5	3

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	214	122	90	90	90

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-214	-122	-90	-80	-80

Initial Supporting table - KaOXYD_b_NOx1LoadChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Full Load condition is enabled

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_SoftExhGasWarmllp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	1

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	1	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_SoftExhGasWarmllp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	0	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	1	1	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	0	0	0	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	1	0	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	0	0	0	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	173	173	173	173	173

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	800	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250
1	30	40	40	60	60	100	110	110	80	80	80	70

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,800	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
3,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	173	173	173	173	173

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-120	-80	-70	-69	-40	0	40	41	42	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - NOX__NOx1_IncrDynCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor dynamic check in increasing direction

NOX_NOx1_IncrDynCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIlp	CeCMBR_e_SoftExhGasWarmIlp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

NOX_S1_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIlp	CeCMBR_e_SoftExhGasWarmIlp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S1_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_.S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OCR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

NOX_S1_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	1	

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor OCR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HIO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

NOX_S1_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HIO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

NOX_S1_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	1	

Initial Supporting table - NOX SIPlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Upstream NOx sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	1	

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIlp	CeCMBR_e_SoftExhGasWarmIlp	CeCMBR_e_DPF_PN
1	0	0	1	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - NOX_.S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OCR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIlp	CeCMBR_e_SoftExhGasWarmIlp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

NOX_S2_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	1	1	

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor OCR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIIp	CeCMBR_e_SoftExhGasWarmIIp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

NOX_S2_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	1	

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Downstream NOx sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmIlp	CeCMBR_e_SoftExhGasWarmIlp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	1	1	

Initial Supporting table - P0106, P2227, P227B, P00C7: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured airflow.

Value Units: kPa
X Unit: g/s

y/x	20	25	30	35	40	45	50	55
1	25	30	34	37	40	42	44	46

Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	0.81	0.80	0.92	0.93	1.09	0.83	1.27	0.99	1.39	1.58	1.91	1.89	1.37	0.62	1.17	0.84	0.68
8	0.62	0.75	0.84	0.68	0.92	1.48	1.37	1.72	1.77	1.85	2.06	1.50	1.52	0.86	1.00	0.87	0.67
12	0.53	0.57	0.66	0.52	0.75	1.29	1.36	1.77	1.77	1.60	1.82	1.43	1.52	1.26	1.22	0.84	1.09
18	0.48	0.48	0.50	0.40	0.58	1.20	1.16	1.45	1.65	1.43	1.65	1.36	1.39	1.36	1.27	1.04	1.07
22	0.47	0.45	0.46	0.36	0.53	1.17	1.09	1.33	1.50	1.34	1.58	1.31	1.33	1.40	1.25	1.10	1.06
24	0.46	0.44	0.44	0.35	0.51	1.15	1.06	1.16	1.43	1.31	1.53	1.29	1.32	1.42	1.26	1.09	1.06
30	0.45	0.42	0.41	0.33	0.47	1.12	1.01	0.92	1.31	1.25	1.47	1.25	1.30	1.43	1.25	1.18	1.10
60	0.42	0.38	0.35	0.28	0.40	1.07	0.89	0.59	1.07	1.11	1.31	1.16	1.22	1.49	1.24	1.31	1.05
98	0.41	0.37	0.33	0.27	0.38	1.04	0.86	0.50	0.98	1.09	1.25	1.12	1.19	1.53	1.23	1.39	1.03

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	-0.77	-1.40	-1.45	-1.22	-1.56	-1.10	-1.24	-0.66	-0.58	-0.45	-0.50	-0.52	-0.69	-0.44	-0.52	-0.26	-0.27
8	-0.91	-0.70	-0.85	-1.05	-0.95	-1.01	-1.01	-1.13	-0.83	-1.22	-0.85	-0.80	-1.29	-0.72	-0.76	-0.32	-0.39
12	-0.90	-0.68	-0.94	-0.97	-1.03	-1.15	-1.27	-1.53	-1.21	-1.34	-1.17	-0.82	-1.23	-1.04	-1.10	-0.63	-0.79
18	-0.87	-0.62	-0.94	-0.93	-1.08	-1.24	-1.52	-1.92	-1.36	-1.52	-1.41	-0.88	-1.22	-1.11	-1.30	-0.92	-0.94
22	-0.86	-0.61	-0.90	-0.90	-1.10	-1.27	-1.61	-2.11	-1.42	-1.60	-1.49	-1.01	-1.26	-1.11	-1.38	-1.04	-1.10
24	-0.87	-0.60	-0.91	-0.90	-1.11	-1.28	-1.65	-2.19	-1.43	-1.63	-1.53	-1.07	-1.28	-1.10	-1.40	-1.03	-1.09
30	-0.87	-0.58	-0.91	-0.88	-1.12	-1.31	-1.73	-2.38	-1.48	-1.69	-1.60	-1.21	-1.30	-1.11	-1.48	-1.14	-1.15
60	-0.87	-0.55	-0.94	-0.86	-1.16	-1.35	-1.90	-2.85	-1.57	-1.82	-1.78	-1.51	-1.34	-1.15	-1.61	-1.36	-1.35
98	-0.87	-0.54	-0.94	-0.85	-1.17	-1.37	-1.96	-3.09	-1.61	-1.87	-1.85	-1.65	-1.37	-1.16	-1.68	-1.44	-1.40

Initial Supporting table - IstFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftrMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	4	4	3	3	3	3	3	3

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	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)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	50	50	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	68	55	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	47	47	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	65	52	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	60	60	60	60	60	60	60	60

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	160	160	160	160	160	160	160	160

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	50	50	50	50	50	50	50	50

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	150	150	150	150	150	150	150	150

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for 02

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF high 02, Rich idle and all HC modes and SCR service warm up. It is function of engine speed).

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF low 02. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 3 or DeNOx mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for *M2*

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 2 or DeSOx Rich mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - Bank_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
6	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
24	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
98	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, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	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
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	0.71	1.17	1.20	1.00	1.00	1.09	1.04	1.21	1.21	1.00	1.21	1.49	1.20	1.08	1.22	1.16	1.00
6	1.00	0.76	0.75	0.75	0.75	1.03	0.98	1.48	1.38	0.97	1.23	1.45	1.36	1.08	1.31	1.24	1.12
8	0.92	0.50	0.60	0.58	0.73	0.94	0.88	1.51	1.21	0.98	1.00	1.16	1.52	1.14	1.43	1.40	1.20
12	1.20	0.49	0.47	0.47	0.65	0.69	0.58	1.30	1.17	0.77	0.86	0.73	0.97	0.96	1.06	1.00	1.64
16	1.24	0.51	0.43	0.41	0.53	0.63	0.51	1.18	1.10	0.69	0.78	0.59	0.69	0.72	0.74	0.78	1.25
24	1.23	0.52	0.40	0.36	0.46	0.57	0.55	0.95	0.86	0.63	0.70	0.54	0.58	0.58	0.55	0.59	0.85
40	1.21	0.53	0.38	0.33	0.40	0.65	0.59	0.62	0.67	0.59	0.65	0.49	0.48	0.55	0.59	0.54	0.67
60	1.21	0.53	0.37	0.31	0.38	0.69	0.61	0.52	0.58	0.57	0.65	0.45	0.45	0.53	0.57	0.51	0.58
98	1.16	0.54	0.36	0.31	0.36	0.72	0.62	0.46	0.51	0.55	0.65	0.43	0.41	0.53	0.55	0.50	0.49

Initial Supporting table - BankCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	1.00	1.83	3.04	2.87	2.66	3.66	2.72	1.38	1.49	1.35	1.46	1.45	1.63	1.09	1.32	1.35	1.23
6	0.77	1.00	1.68	2.00	1.54	2.88	2.00	1.36	1.47	1.82	1.66	1.55	1.79	1.17	1.52	1.43	1.30
8	1.04	0.79	1.27	1.54	1.28	1.83	1.41	1.18	1.36	1.20	1.44	1.50	1.96	1.28	1.76	1.53	1.44
12	1.16	0.97	1.15	1.20	1.22	1.30	1.24	1.08	1.14	1.06	0.98	1.14	1.20	1.15	1.40	1.42	1.86
16	1.10	1.06	1.09	1.05	1.19	1.27	1.39	1.37	1.09	1.01	0.90	1.08	1.02	0.82	0.96	1.14	1.56
24	1.04	1.14	1.04	0.91	1.16	1.24	1.56	1.76	1.10	0.96	0.94	1.08	0.92	0.69	0.80	0.87	1.18
40	1.01	1.20	1.00	0.81	1.14	1.21	1.68	2.19	1.10	0.92	0.96	1.07	0.80	0.63	0.73	0.70	0.97
60	1.00	1.23	0.98	0.77	1.13	1.20	1.75	2.45	1.11	0.90	0.98	1.07	0.82	0.65	0.73	0.61	0.85
98	0.99	1.25	0.96	0.73	1.11	1.19	1.80	2.68	1.11	0.89	0.99	1.07	0.83	0.67	0.72	0.54	0.74

Initial Supporting table - Cat2_CrtdEffThrsh

Description: Minimum Second Catalyst (UF DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	7.5000	7.5000	7.5000	7.5000	7.5000	7.5000

Initial Supporting table - Cat2_CrtdMaxFuel

Description: Maximum integrated exhaust injected fuel quantity (by HCI) threshold [g], as function of ambient temperature [K], needed to stop Second Catalyst integrators (heat and injected fuel) and calculate the Aging Index

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	140.0000	140.0000	140.0000	140.0000	140.0000	140.0000

Initial Supporting table - Cat2CrtdEffRepEWMA

Description: Minimum Second Catalyst (UF DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Second Catalyst EWMA filter enabled and Second Catalyst conversion inefficiency previously detected (Second Catalyst FA = TRUE)

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	7.5000	7.5000	7.5000	7.5000	7.5000	7.5000

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
10	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
20	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
30	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
40	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
50	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
60	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
70	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
80	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
90	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
100	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0

Initial Supporting table - CatCrtdEffRepEWMA

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Catalyst EWMA filter enabled and Catalyst conversion inefficiency previously detected (Catalyst FA= TRUE)

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Initial Supporting table - CatCrtdEffThrsh

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

y/x	250.00	266.00	282.00	298.00	314.00	340.00
1.00	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	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
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
50	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
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	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, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	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
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
50	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
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	1.71	2.30	1.81	2.65	1.57	1.20	1.88	1.02	1.84	1.87	1.39	1.57	1.80	1.69	1.78	1.58	1.05
6	0.85	1.71	1.33	1.81	1.49	1.04	1.64	1.17	1.90	1.90	1.39	1.58	2.04	1.71	1.81	1.65	1.12
8	0.93	1.39	1.39	1.45	1.33	1.06	1.41	1.16	1.52	1.63	1.24	1.32	2.33	1.73	1.79	1.73	1.20
12	1.53	1.47	1.28	1.31	1.42	0.79	1.12	1.14	1.12	1.09	0.98	1.08	1.66	1.43	1.44	1.11	1.45
16	1.87	1.53	1.13	1.15	1.34	1.14	1.05	1.18	1.23	0.92	0.98	0.97	1.26	1.14	1.30	0.83	1.08
24	2.20	1.58	1.02	1.02	1.28	1.52	1.29	1.10	1.14	0.81	1.01	0.81	0.88	0.98	1.09	0.91	0.94
40	2.08	1.62	0.94	0.94	1.24	1.86	1.47	0.83	1.06	0.89	1.04	0.78	0.72	0.85	0.95	1.00	1.22
60	1.58	1.63	0.90	0.91	1.22	2.03	1.56	0.74	1.03	0.89	1.05	0.75	0.65	0.79	0.88	1.00	1.39
98	0.97	1.66	0.87	0.88	1.21	2.17	1.64	0.69	1.00	0.91	1.06	0.72	0.60	0.75	0.82	1.02	1.53

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	-1	-1	-1	-1	-1	-5	-2	-1	-2	-1	-2	-1	-1	-1	-1	-1	-1
6	-1	-1	-1	-1	-1	-4	-2	-1	-3	-2	-2	-1	-1	-1	-1	-1	-1
8	-1	0	0	-1	0	-2	-2	-1	-3	-1	-2	-1	-1	-1	-1	-1	-1
12	0	0	0	0	0	-1	-2	-2	-4	-1	-2	-1	-1	-1	-1	-1	-1
16	0	0	0	0	0	0	-2	-3	-3	-2	-2	-1	-1	-1	-1	-1	-1
24	0	0	0	0	0	0	-2	-3	-3	-4	-2	-1	-2	-1	-1	-1	-1
40	0	0	0	0	0	1	-2	-4	-3	-5	-2	-2	-2	-2	-1	-1	-1
60	0	0	0	0	0	1	-2	-5	-3	-5	-2	-2	-2	-2	-1	-1	-1
98	0	0	0	0	0	1	-1	-5	-3	-6	-2	-2	-2	-2	-1	-1	-1

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Mulitplier to medres decel to account for different patte rn of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	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
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	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	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider.   Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	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
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - C3ylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	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
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
50	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
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	120	89	78	39	36	18	19
2	1,014	689	483	304	207	166	112	80	71	36	30	18	18
4	794	411	312	212	150	133	101	69	61	31	23	17	18
6	1,159	628	437	288	185	132	91	68	47	26	20	16	17
8	1,575	986	575	375	230	167	80	69	43	28	21	17	19
10	2,041	1,344	824	465	291	199	101	71	50	31	25	19	22
12	2,467	1,702	1,078	630	403	263	118	89	51	33	29	22	25
14	2,893	2,060	1,332	796	515	327	135	105	60	36	33	25	27
16	3,318	2,418	1,586	962	626	391	151	121	68	39	36	28	30
18	3,744	2,776	1,839	1,127	738	455	168	138	77	44	40	30	32
20	4,170	3,134	2,093	1,294	850	520	185	154	86	49	44	33	35
22	4,595	3,492	2,347	1,458	961	584	202	170	95	55	48	36	38
24	5,021	3,850	2,600	1,624	1,073	647	219	187	115	60	52	39	40
30	6,298	4,924	3,362	2,123	1,408	839	269	236	170	76	64	47	48
40	8,426	6,715	4,630	2,949	1,966	1,160	353	317	263	103	83	61	61
60	12,682	10,295	7,168	4,604	3,083	1,802	521	480	448	157	122	88	87
97	20,663	17,008	11,925	7,711	5,177	3,005	836	787	796	258	195	140	135

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	19	15	12	11	13	11	8	32,768	32,768	32,768	32,768	32,768	32,768
2	18	14	10	11	13	11	8	32,768	32,768	32,768	32,768	32,768	32,768
4	15	13	9	10	12	10	8	32,768	32,768	32,768	32,768	32,768	32,768
6	13	12	8	9	11	9	7	32,768	32,768	32,768	32,768	32,768	32,768
8	11	11	7	8	10	8	7	32,768	32,768	32,768	32,768	32,768	32,768
10	12	10	8	9	9	7	7	32,768	32,768	32,768	32,768	32,768	32,768
12	15	12	9	10	8	6	6	32,768	32,768	32,768	32,768	32,768	32,768
14	17	13	11	11	9	6	7	32,768	32,768	32,768	32,768	32,768	32,768
16	20	15	12	12	9	7	7	32,768	32,768	32,768	32,768	32,768	32,768
18	22	17	13	13	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
20	25	18	15	14	11	8	8	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeDecel

22	27	20	16	15	11	9	9	32,768	32,768	32,768	32,768	32,768	32,768
24	30	22	18	16	12	9	9	32,768	32,768	32,768	32,768	32,768	32,768
30	37	27	22	19	14	11	11	32,768	32,768	32,768	32,768	32,768	32,768
40	49	36	30	24	18	14	13	32,768	32,768	32,768	32,768	32,768	32,768
60	74	53	45	35	25	19	18	32,768	32,768	32,768	32,768	32,768	32,768
97	120	84	73	55	39	30	28	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
Y Units: percent load of max indicated torque (%)

CylModeJerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	185	95	119	64	65	40	31	26
2	931	618	409	271	181	143	74	81	62	52	33	27	24
4	755	490	323	190	135	92	62	47	58	40	26	23	22
6	1,044	738	517	314	178	144	73	58	54	39	17	19	20
8	1,422	1,032	736	437	267	195	105	74	60	39	23	21	20
10	1,821	1,325	943	560	356	246	137	91	66	39	28	24	22
12	2,211	1,618	1,168	683	445	297	169	108	72	46	34	27	25
14	2,637	1,911	1,370	807	534	349	200	130	78	53	39	30	28
16	3,045	2,204	1,591	930	623	400	232	142	84	59	45	34	31
18	3,506	2,497	1,807	1,053	711	451	264	159	90	66	51	37	34
20	3,972	2,791	2,016	1,176	800	503	295	176	96	73	56	41	37
22	4,357	3,084	2,238	1,300	889	554	327	193	102	80	62	44	39
24	4,727	3,377	2,451	1,423	978	605	359	209	108	87	67	48	42
30	5,969	4,256	3,099	1,793	1,245	759	454	260	126	107	84	58	50
40	7,988	5,722	4,181	2,409	1,689	1,016	612	345	156	142	111	76	64
60	12,070	8,654	6,347	3,642	2,577	1,528	929	514	216	210	167	110	92
97	19,725	14,151	10,393	5,953	4,243	2,490	1,523	832	328	338	271	176	143

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	23	18	16	13	13	13	11	32,768	32,768	32,768	32,768	32,768	32,768
2	21	17	15	13	13	12	11	32,768	32,768	32,768	32,768	32,768	32,768
4	18	16	13	12	12	11	10	32,768	32,768	32,768	32,768	32,768	32,768
6	15	15	11	11	11	10	10	32,768	32,768	32,768	32,768	32,768	32,768
8	12	13	9	10	10	9	9	32,768	32,768	32,768	32,768	32,768	32,768
10	15	12	9	9	9	8	9	32,768	32,768	32,768	32,768	32,768	32,768
12	18	13	10	10	9	7	9	32,768	32,768	32,768	32,768	32,768	32,768
14	20	15	11	10	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
16	23	17	13	11	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
18	25	19	14	12	10	9	9	32,768	32,768	32,768	32,768	32,768	32,768
20	27	21	15	13	11	10	11	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

22	29	23	16	14	12	10	12	32,768	32,768	32,768	32,768	32,768	32,768
24	31	25	18	16	13	11	13	32,768	32,768	32,768	32,768	32,768	32,768
30	37	31	21	19	15	13	16	32,768	32,768	32,768	32,768	32,768	32,768
40	48	40	28	24	20	17	22	32,768	32,768	32,768	32,768	32,768	32,768
60	69	60	40	34	28	23	33	32,768	32,768	32,768	32,768	32,768	32,768
97	108	96	64	53	44	36	53	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - DeacCylInversionDecel

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong"   If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	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
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

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.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	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
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,200	5,200	5,200	5,200	5,200	5,200	5,200

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,200	5,200	5,200	5,200	5,200	5,200	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - K_EffExhFlowCond

Description: Enablement table, function of exhaust flow and SCR average temperature [boolean] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: boolean
X Unit: °C
Y Units: g/sec

y/x	150	175	200	225	250	275	305	325	350	375	410	425	450	475	500
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
75	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
100	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
125	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
150	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
175	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
200	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
225	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
250	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
275	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
325	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - K_EffOffset

Description: Offset table to calculate reference efficiency for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: [ ]
X Unit: °C
Y Units: g/sec

y/x	180	200	225	240	250	260	300
10	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35	0.20	0.20	0.20	0.20	0.20	0.20	0.20
50	0.20	0.20	0.20	0.20	0.20	0.20	0.20
70	0.20	0.20	0.20	0.20	0.20	0.20	0.20
80	0.20	0.20	0.20	0.20	0.20	0.20	0.20
100	0.20	0.20	0.20	0.20	0.20	0.20	0.20
150	0.20	0.20	0.20	0.20	0.20	0.20	0.20
200	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - m_NH3_StrgDevErrMaxThrsh

Description: Upper boundary of NH3 storage deviation error [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	225	250	275	300	325	350	375	400
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 storage deviation error [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	225	250	275	300	325	350	375	400
1	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Upper boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	250	275	300	325	350	400	450
1	5	5	5	5	5	5	5	5

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	225	250	275	300	325	350	375	400
1	1	1	1	1	1	1	1	1

Initial Supporting table - m SlipNOxintglThrsh

Description: NOx integral threshold to enable slip condition based on SCR average temperature [mg] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: mg
X Unit: °C

y/x	230	275	276	425
1	0	0	0	0

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM   (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	3	3	3	3	3	3	3	3

Initial Supporting table - P0101: Manifold pressure High limit in Overrun

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Description: Intake manifold pressure high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	115	120	125	130	135	140	140	140

Initial Supporting table - P0101: Manifold pressure Low limit in Overrun

Description: Intake manifold pressure low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	70	70	70	70	70	70	70	70

Initial Supporting table - P0101: Pulsation Map

Description: Adjustment of the air mass flow measured by the MAF sensor for flow distribution and pulsations. It is function of engine speed (X axis) and fuel request (Y axis)

Value Units: const
X Unit: rpm
Y Units: mm^3

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,020	3,200	3,400	3,600
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0101: VGT position High limit in Overrun

Description: VGT position high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	100	100	100	100	100	100	100	100

Initial Supporting table - P0101: VGT position Low limit in Overrun

Description: VGT position low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	0	0	0	0	0	0	0	0

Initial Supporting table - P0234, P2263: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	220	220	220	220

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	176	164	150	150

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,200
1	1	1	1	1	1	1	0	0	0	0

Initial Supporting table - P0299, P2263: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	150	160	170	180

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	84	94	104	114

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	2	2	2	1	1	1	1	1	1	1

Initial Supporting table - P0401, P04I02: EGR intrusive test enabling

Description: Calibration map to choose if the EGR intrusive test is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401, P0402: EGR intrusive test enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-80	-80	-80	-80	-80	-80	-80	-80
8	-80	-80	-80	-80	-80	-80	-80	-80
10	-80	-80	-80	-80	-80	-80	-80	-80
12	-80	-80	-80	-80	-80	-80	-80	-80
18	-80	-80	-80	-80	-80	-80	-80	-80
24	-80	-80	-80	-80	-80	-80	-80	-80
30	-80	-80	-80	-80	-80	-80	-80	-80
36	-80	-80	-80	-80	-80	-80	-80	-80
40	-80	-80	-80	-80	-80	-80	-80	-80

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-120	-120	-120	-120	-120	-120	-120	-120
8	-120	-120	-120	-120	-120	-120	-120	-120
10	-120	-120	-120	-120	-120	-120	-120	-120
12	-120	-120	-120	-120	-120	-120	-120	-120
18	-120	-120	-120	-120	-120	-120	-120	-120
24	-120	-120	-120	-120	-120	-120	-120	-120
30	-120	-120	-120	-120	-120	-120	-120	-120
36	-120	-120	-120	-120	-120	-120	-120	-120
40	-120	-120	-120	-120	-120	-120	-120	-120

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-192	-192
8	-144	-144	-144	-144	-144	-184	-192	-192
10	-144	-144	-144	-144	-144	-184	-192	-192
12	-144	-144	-144	-144	-144	-184	-192	-192
18	-144	-144	-144	-144	-144	-184	-192	-192
24	-144	-144	-144	-144	-144	-192	-192	-192
30	-144	-144	-144	-144	-144	-144	-144	-144
36	-144	-144	-144	-144	-144	-144	-144	-144
40	-144	-144	-144	-144	-144	-144	-144	-144

Initial Supporting table - P0401: Insufficient EGRflow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	-256	40	40	40	40	-256	-256	-256
55	-256	40	40	40	40	-256	-256	-256
60	-256	40	40	40	40	-256	-256	-256
65	-256	40	40	40	40	-256	-256	-256
70	-256	40	40	40	40	-256	-256	-256
75	-256	40	40	40	40	-256	-256	-256
80	-256	40	40	40	40	-256	-256	-256
85	-256	40	40	40	40	-256	-256	-256
90	-256	40	40	40	40	-256	-256	-256
100	-256	40	40	40	40	-256	-256	-256
110	-256	40	40	40	40	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	256	5	5	5	5	256	256	256
55	256	5	5	5	5	256	256	256
60	256	5	5	5	5	256	256	256
65	256	5	5	5	5	256	256	256
70	256	5	5	5	5	256	256	256
75	256	5	5	5	5	256	256	256
80	256	5	5	5	5	256	256	256
85	256	5	5	5	5	256	256	256
90	256	5	5	5	5	256	256	256
100	256	5	5	5	5	256	256	256
110	256	5	5	5	5	256	256	256

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient EGRflow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient EGR intrusive test Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR intrusive test Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Minimum desired EGRflow

Description: Minimum desired EGR flow above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	124	124	124	224	224	224	224	224
55	124	124	124	224	224	224	224	224
60	124	124	124	224	224	224	224	224
65	124	124	124	224	224	224	224	224
70	124	124	124	224	224	224	224	224
75	124	124	124	224	224	224	224	224
80	52	52	52	172	172	172	172	172
85	52	52	52	172	172	172	172	172
90	52	52	52	172	172	172	172	172
100	52	52	52	172	172	172	172	172
110	52	52	52	172	172	172	172	172

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for *M2*

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: **°C**
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

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	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

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	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

Initial Supporting table - P140B: Increasing EGR slow response threshold

Description: Threshold for increasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	1	1	1

Initial Supporting table - P140C: Decreasing EGR slow response threshold

Description: Threshold for decreasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	1	1	2

Initial Supporting table - P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Maximum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

y/x	1	2	3	4	5	6
1	80	80	80	80	80	80

Initial Supporting table - P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

y/x	1	2	3	4	5	6
1	3	3	3	3	3	3

Initial Supporting table - P2457: Minimum time for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed time as a function of HP EGR filtered flow to run HP EGR cooler efficiency diagnostic once that all HP EGR flow enabling conditions are reached.

Value Units: s
X Unit: g/s

y/x	0	20	40	60	80	100
1	7	7	6	5	4	4

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	40	40	40	40	40	40	130	180	230
2	40	40	40	40	40	40	130	180	230
3	40	40	40	40	40	40	130	180	230
5	40	40	40	40	40	40	130	180	230
6	40	40	40	40	40	40	130	180	230
8	40	40	40	40	40	40	130	180	230
9	40	40	40	40	40	40	130	180	230
11	40	40	40	40	40	40	130	180	230
12	40	40	40	40	40	40	130	180	230
14	40	40	40	40	40	40	130	180	230
15	40	40	40	40	40	40	130	180	230
17	40	40	40	40	40	40	130	180	230
18	40	40	40	40	40	40	130	180	230
20	40	40	40	40	40	40	130	180	230
21	40	40	40	40	40	40	130	180	230
23	40	40	40	40	40	40	130	180	230
24	40	40	40	40	40	60	130	180	230
26	40	40	40	40	40	60	130	180	230
27	40	40	40	40	40	60	130	180	230
29	40	40	40	40	40	60	130	180	230
30	40	40	40	40	40	60	130	180	230
32	40	40	40	40	40	60	130	180	230
33	40	40	40	40	40	60	130	180	230
35	40	40	40	40	40	60	130	180	230
36	40	40	40	40	40	60	130	180	230
38	40	40	40	40	40	60	130	180	230
39	40	40	40	40	40	60	130	180	230
41	40	40	40	40	40	60	130	180	230
42	40	40	40	40	40	60	130	180	230
44	40	40	40	40	40	60	130	180	230
45	40	40	40	40	40	60	130	180	230

Initial Supporting table - P•2635 Threshold High

47	40	40	40	40	40	60	130	180	230
48	40	40	40	40	40	60	130	180	230

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	-190	-190	-190	-190	-190	-190	-190
2	-190	-190	-190	-190	-190	-190	-190	-190	-190
3	-190	-190	-190	-190	-190	-190	-190	-190	-190
5	-190	-190	-190	-190	-190	-190	-190	-190	-190
6	-190	-190	-190	-190	-190	-190	-190	-190	-190
8	-190	-190	-190	-190	-190	-190	-190	-190	-190
9	-190	-190	-190	-190	-190	-190	-190	-190	-190
11	-190	-190	-190	-190	-190	-190	-190	-190	-190
12	-190	-190	-190	-190	-190	-190	-190	-190	-190
14	-190	-190	-190	-190	-190	-190	-190	-190	-190
15	-190	-190	-190	-190	-190	-190	-190	-190	-190
17	-190	-190	-190	-190	-190	-190	-190	-190	-190
18	-190	-190	-190	-190	-190	-190	-190	-190	-190
20	-190	-190	-190	-190	-190	-190	-190	-190	-190
21	-190	-190	-190	-190	-190	-190	-190	-190	-190
23	-190	-190	-190	-190	-190	-190	-190	-190	-190
24	-190	-190	-190	-190	-190	-190	-190	-190	-190
26	-190	-190	-190	-190	-190	-190	-190	-190	-190
27	-190	-190	-190	-190	-190	-190	-190	-190	-190
29	-190	-190	-190	-190	-190	-190	-190	-190	-190
30	-190	-190	-190	-190	-190	-190	-190	-190	-190
32	-190	-190	-190	-190	-190	-190	-190	-190	-190
33	-190	-190	-190	-190	-190	-190	-190	-190	-190
35	-190	-190	-190	-190	-190	-190	-190	-190	-190
36	-190	-190	-190	-190	-190	-190	-190	-190	-190
38	-190	-190	-190	-190	-190	-190	-190	-190	-190
39	-190	-190	-190	-190	-190	-190	-190	-190	-190
41	-190	-190	-190	-190	-190	-190	-190	-190	-190
42	-190	-190	-190	-190	-190	-190	-190	-190	-190
44	-190	-190	-190	-190	-190	-190	-190	-190	-190
45	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - P2635 Threshold Low

47	-190	-190	-190	-190	-190	-190	-190	-190	-190
48	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - Pair_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	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
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	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
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	2.09	1.90	1.80	2.27	1.29	1.15	1.33	1.00	1.35	1.67	1.76	1.49	1.40	1.23	1.44	1.53	1.26
6	1.15	0.87	1.20	1.04	0.68	0.98	1.07	1.16	1.50	1.69	1.68	1.45	1.56	1.17	1.56	1.41	1.29
8	0.93	0.94	0.98	1.27	1.08	1.13	0.79	1.44	1.77	1.46	1.42	1.10	1.67	1.09	1.64	1.33	1.33
12	0.96	0.85	1.05	1.26	1.23	1.06	0.92	1.57	2.03	1.54	1.55	1.00	1.17	1.13	1.11	0.90	1.45
16	0.89	0.82	1.00	1.15	1.20	1.27	0.89	1.44	2.17	1.63	1.69	1.14	1.15	1.28	1.26	0.91	1.08
24	0.85	0.79	0.95	1.08	1.17	1.49	0.86	1.17	1.93	1.68	1.84	1.24	1.24	1.35	1.31	1.16	1.28
40	0.82	0.77	0.93	1.03	1.15	1.67	0.84	0.79	1.73	1.75	1.99	1.36	1.33	1.42	1.37	1.35	1.56
60	0.80	0.76	0.92	1.00	1.14	1.77	0.83	0.66	1.62	1.79	2.07	1.42	1.36	1.47	1.40	1.44	1.76
98	0.79	0.76	0.91	0.99	1.14	1.85	0.82	0.59	1.53	1.82	2.12	1.47	1.40	1.52	1.43	1.54	1.90

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	1.88	2.01	1.42	1.77	2.01	1.91	1.94	1.03	1.18	1.45	1.50	1.14	1.31	1.03	1.24	1.43	1.14
6	1.03	0.80	0.62	1.26	1.01	1.51	1.37	1.03	1.08	2.09	1.66	1.20	1.48	1.03	1.38	1.43	1.20
8	1.10	0.84	0.83	1.19	1.18	0.96	0.90	0.86	1.10	1.49	1.37	1.15	1.67	1.12	1.53	1.42	1.28
12	0.93	0.84	1.05	1.24	1.34	0.95	0.67	0.69	1.16	1.30	1.34	1.04	0.97	1.19	1.05	1.10	1.50
16	0.92	0.85	1.17	1.27	1.42	0.97	0.53	0.78	1.07	1.21	1.31	1.08	1.02	1.21	1.20	0.95	1.13
24	0.88	0.85	1.26	1.31	1.49	1.00	0.40	0.88	0.97	1.11	1.31	1.17	1.18	1.22	1.37	1.13	1.23
40	0.87	0.86	1.34	1.35	1.55	1.01	0.30	0.99	0.88	1.05	1.30	1.26	1.31	1.24	1.55	1.26	1.30
60	0.86	0.87	1.39	1.35	1.58	1.02	0.24	1.05	0.84	1.01	1.30	1.31	1.37	1.24	1.63	1.33	1.39
98	0.85	0.87	1.42	1.37	1.61	1.03	0.20	1.11	0.81	0.98	1.29	1.35	1.43	1.24	1.69	1.37	1.43

Initial Supporting table - Random_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	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
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	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
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	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
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	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
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplierto Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	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
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
50	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
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	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, Mulitplier 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.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	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
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
50	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
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

Description: Used for P0300 - P0308. Multiplier to CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
2	1.00	1.00	1.12	1.00	1.00	1.18	1.26	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.22	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.26	1.00	1.00	1.00	1.11	1.00	1.02	1.50	1.21	1.52	1.00	1.00	1.00	1.00	1.00	1.00
10	1.11	1.37	1.19	1.34	1.27	1.91	1.27	1.58	1.70	1.53	1.82	1.14	1.63	1.55	1.27	1.00	1.00
14	1.17	1.28	1.11	1.23	1.19	2.10	1.42	1.93	1.85	1.57	1.90	1.26	1.50	1.58	1.24	1.10	1.33
24	1.22	1.21	1.05	1.15	1.13	2.33	1.57	1.82	1.68	1.65	2.00	1.45	1.39	1.53	1.26	1.16	1.50
30	1.24	1.19	1.04	1.14	1.11	2.40	1.61	1.56	1.60	1.68	2.03	1.52	1.37	1.50	1.23	1.21	1.57
60	1.27	1.16	1.02	1.11	1.08	2.55	1.69	1.22	1.45	1.73	2.10	1.66	1.29	1.49	1.20	1.27	1.71
98	1.27	1.15	1.01	1.10	1.06	2.61	1.72	1.12	1.39	1.75	2.12	1.72	1.27	1.49	1.19	1.31	1.78

Initial Supporting table - RandomCylModJerk

Description: Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattearn of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
2	1.00	1.00	1.11	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
4	1.00	1.07	1.39	1.16	1.19	1.00	1.22	1.00	1.00	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.03	1.12	1.26	1.00	1.02	1.00	1.26	1.24	1.00	1.00	1.00	1.00	1.00	1.00
10	1.17	1.05	1.12	1.08	1.19	1.15	1.03	1.25	1.20	1.13	1.19	1.00	1.00	1.00	1.00	1.00	1.00
14	1.13	1.02	1.17	1.13	1.26	1.12	1.15	1.41	1.28	1.10	1.23	1.00	1.00	1.10	1.05	1.05	1.00
24	1.04	1.02	1.23	1.20	1.38	1.08	1.37	1.65	1.26	1.07	1.25	1.08	1.11	1.18	1.14	1.03	1.00
30	1.03	1.02	1.24	1.22	1.42	1.07	1.41	1.75	1.26	1.07	1.27	1.13	1.14	1.21	1.19	1.05	1.00
60	1.00	1.02	1.27	1.25	1.49	1.05	1.50	1.97	1.25	1.06	1.29	1.21	1.22	1.26	1.26	1.09	1.00
98	1.00	1.02	1.28	1.27	1.49	1.06	1.55	2.08	1.24	1.05	1.29	1.24	1.25	1.28	1.30	1.09	1.00

Initial Supporting table - RandomRevModDecl

Description: Used for P0300 - P0308, Mulitplier to RevModeJDecel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,001	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
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	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
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier
X Unit: RPM

y/x	600	1,000	1,200	1,400	1,600	1,800	2,200	2,600	3,200
1	1.00	1.15	1.40	1.00	1.40	1.20	1.20	1.20	1.10

Initial Supporting table - RevMode_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time between revolutions (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1	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
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	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	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
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
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.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4	4	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.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	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
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
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
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.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	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
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
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
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 ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	600	1,000	1,200	1,400	1,600	1,800	2,200	2,600	3,200
1	1.30	1.30	1.55	1.30	1.25	1.40	1.50	1.10	1.10
1	1.30	1.30	1.70	1.40	1.30	1.15	1.35	1.00	1.10
1	2.20	2.20	2.40	1.30	1.10	1.50	1.15	1.00	1.60
1	2.00	2.00	3.35	2.15	1.40	1.15	1.10	1.00	1.40
1	2.00	2.00	2.80	2.30	2.15	1.45	1.30	1.05	1.70
2	2.20	2.20	3.40	3.50	2.70	1.55	1.20	1.20	1.80
2	1.35	1.90	2.60	2.40	2.00	1.50	1.30	1.45	1.95
3	1.10	1.40	1.45	1.70	1.50	1.50	1.60	1.40	2.05
5	1.10	1.30	2.10	1.55	1.30	1.30	1.90	1.30	1.40

Initial Supporting table - t DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: °C/sec

y/x	-30	-25	-20	-15	15	24	30	40
1	25	20	12	0	0	50	60	60

Initial Supporting table - T_MaxTempGrad

Description: Upper boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	-14	19	55	91	126	160	191	246

Initial Supporting table - T MinTempGrad

Description: Lower boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	250	275	300	325	350	375	400	450
1	20	20	20	20	20	20	20	20

Initial Supporting table - t NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow becomes in range [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: mg/sec
Y Units: sec

y/x	5	15	30	45	60	90	120
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0
100	5	5	5	5	10	10	10
150	5	5	5	5	10	10	10
200	5	5	5	5	10	10	10

Initial Supporting table - TOSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion Value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	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
75	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
85	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
95	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
105	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

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	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
75	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
85	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
95	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
105	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 - ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-1.93	-1.93	-2.78	-2.56	-1.98	-2.00	-2.60	-1.98	-1.85	-2.00	-4.21	-3.42	-2.81
75	-1.55	-1.55	-2.01	-2.27	-1.70	-1.92	-1.99	-1.35	-1.17	-1.35	-2.74	-2.17	-0.98
85	-0.72	-0.72	-0.87	-1.57	-0.92	-1.31	-1.03	-0.26	0.14	0.09	-0.60	-0.30	1.09
95	-0.54	-0.54	-0.69	-0.42	-0.04	0.20	0.16	-0.11	0.20	-0.49	-0.31	-0.02	1.09
105	-0.54	-0.54	-0.69	-0.42	-0.04	0.20	0.16	-0.11	0.20	-0.49	-0.31	-0.02	1.09

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	-2.20	-1.59	-0.98	-0.38	0.23	0.84	1.45	2.06	2.67	3.27	3.88	5.10	6.31
75	0.21	1.40	2.59	3.78	4.97	6.15	7.34	8.53	9.72	10.91	12.10	14.47	16.85
85	2.47	3.85	5.23	6.61	7.99	9.38	10.75	12.13	13.52	14.90	16.28	19.04	21.81
95	2.19	3.29	4.39	5.49	6.59	7.69	8.80	9.89	11.00	12.10	13.20	15.41	17.61
105	2.19	3.29	4.39	5.49	6.59	7.69	8.80	9.89	11.00	12.10	13.20	15.41	17.61

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	50	50	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	68	55	42	29	16	16

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	47	47	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	65	52	39	26	13	13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	60	60	60	60	60	60	60	60

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	160	160	160	160	160	160	160	160

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF and HCS combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	50	50	50	50	50	50	50	50

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during DPF rich idle combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	150	150	150	150	150	150	150	150

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for 02

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF high 02, Rich idle and all HC modes and SCR service warm up. It is function of engine speed).

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in DPF low 02. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in SCR temp 1 or DeSOx lean mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 3 or DeNOx mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for *M2*

Description: Threshold above which the pressure closed loop control is enabled in SCR temp 2 or DeSOx Rich mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - Cold_Montr_Comb_ModeEnbl

Description: Boolean array that has the task of enabling or freezing the catalyst Cold Start Monitor. Each ordered element indicates, respectively, if the current combustion mode shall enable (if TRUE) or freeze (if FALSE) the Monitor.

X Unit: combustion mode identifier
Y Units: Boolean

Cold_Montr_Comb_ModeEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

Cold_Montr_Comb_ModeEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

Cold_Montr_Comb_ModeEnbl - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

Cold_Montr_Comb_ModeEnbl - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeS Ox_Lea n	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeEnblGrp - Part 3

y/x	CeCMBR_e_Soft Exh Gas WarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_Eng Prtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_S CR_Se rvWa rmL)p	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_CombModeRelGrp

Description: Enable FSA correction release based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeRelGrp - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeS Ox_Lea n	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 3

y/x	CeCMBR_e_Soft Exh Gas WarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_Eng Prtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_S CR_Se rvWa rmL)p	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_ECM_CombModeGrp

Description: Enable P026C and P026D in specific combustion modes and select related threshold maps based on calibrated group

Value Units: -
X Unit: -

KaFADR_e_FSA_ECM_CombModeGrp - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 2

y/x	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_ECM_CombModeGrp - Part 3

y/x	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 4

y/x	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn	CeCMBR_e_HCS_DeHC_Drive
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 5

y/x	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,800	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
3,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtHi

Description: Curve of the weighting factor dependent on ambient pressure for P026D

Value Units: -
X Unit: kPa

y/x	72	85	100
1	1	1	1

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtLo

Description: Curve of the weighting factor dependent on ambient pressure for P026C

Value Units: -
X Unit: kPa

y/x	72	85	100
1	1	1	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	41	70	80	90
1,100	14	15	14	13	13	14	14	14	14	14
1,200	14	15	15	13	13	15	15	15	15	15
1,300	12	14	15	15	14	15	15	15	15	15
1,400	12	15	16	17	16	16	16	16	16	16
1,500	14	16	17	18	17	17	17	17	17	17
1,600	17	16	17	17	17	17	17	17	17	17
1,700	17	14	16	17	17	17	17	17	17	17
1,800	16	14	16	17	17	17	17	17	17	17

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	41	70	80	90
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	41	70	80	90
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp1

Description: Map to define P026C threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	32	33	34	35
1,100	-3	-5	-5	-4	-5	-4	-4	-4	-4	-4
1,200	-5	-4	-3	-4	-3	-2	-2	-2	-3	-3
1,300	-3	-1	-3	-3	-3	-3	-2	-2	-1	-1
1,400	-2	-2	-3	-3	-2	-2	-3	-2	-2	-2
1,500	-2	-3	-2	-2	-2	-2	-1	-1	-1	-1
1,600	-1	-3	-1	-2	-2	-2	-1	-1	-2	-2
1,700	-1	-3	-1	-2	-2	-2	-1	-1	-2	-2
1,800	-1	-3	-1	-2	-2	-2	-1	-1	-2	-2

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp2

Description: Map to define P026C threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	32	33	34	35
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp3

Description: Map to define P026C threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	32	33	34	35
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - P0234, P2263: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	220	220	220	220

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	176	164	150	150

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-25
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-11	-10	-10	-11	-11	-11	-25
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-9	-10	-10	-11	-11	-11	-25
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-12	-12	-12	-12	-25
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-9	-11	-11	-12	-12	-12	-25
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-9	-13	-11	-13	-15	-17	-25
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-19	-17	-20	-20	-25
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-9	-14	-23	-23	-24	-23	-25
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-25	-25	-25	-25	-25

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,200
1	1	1	1	1	1	1	0	0	0	0

Initial Supporting table - P0299, P2263: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	150	160	170	180

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	84	94	104	114

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	25	30	36	36	36	36	36
1,300	13	11	11	11	10	10	15	21	24	30	35	38	42	45	49
1,400	13	11	11	11	10	10	15	21	24	30	34	41	48	54	61
1,500	13	11	11	11	11	12	15	21	23	28	33	38	45	52	59
1,600	13	11	11	11	11	14	15	21	23	26	30	34	42	50	58
1,700	13	11	11	11	11	14	17	21	23	26	30	34	41	47	54
1,800	13	11	11	11	12	14	17	21	23	26	30	35	39	45	50
1,900	12	11	11	11	11	14	17	21	23	29	32	35	38	42	45
2,000	11	10	10	10	10	14	17	21	23	30	34	35	37	38	39
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	39

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	2	2	2	1	1	1	1	1	1	1

Initial Supporting table - P0401, P04l02: EGR intrusive test enabling

Description: Calibration map to choose if the EGR intrusive test is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401, P0402: EGR intrusive test enabling - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P0401, P0402: EGR intrusive test enabling - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient EGR flow monitor. It is function of air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	0	0	0	0	0	0	0	1	2

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-40	-40	-40	-40	-40	-40	-40	-40
8	-40	-40	-40	-40	-40	-40	-40	-40
10	-40	-40	-40	-40	-40	-40	-40	-40
12	-40	-40	-40	-40	-40	-40	-40	-40
18	-40	-40	-40	-40	-40	-40	-40	-40
24	-40	-40	-40	-40	-40	-40	-40	-40
30	-40	-40	-40	-40	-40	-40	-40	-40
36	-40	-40	-40	-40	-40	-40	-40	-40
40	-40	-40	-40	-40	-40	-40	-40	-40

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-80	-80	-80	-80	-80	-80	-80	-80
8	-80	-80	-80	-80	-80	-80	-80	-80
10	-80	-80	-80	-80	-80	-80	-80	-80
12	-80	-80	-80	-80	-80	-80	-80	-80
18	-80	-80	-80	-80	-80	-80	-80	-80
24	-80	-80	-80	-80	-80	-80	-80	-80
30	-80	-80	-80	-80	-80	-80	-80	-80
36	-80	-80	-80	-80	-80	-80	-80	-80
40	-80	-80	-80	-80	-80	-80	-80	-80

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-120	-120	-120	-120	-120	-120	-120	-120
8	-120	-120	-120	-120	-120	-120	-120	-120
10	-120	-120	-120	-120	-120	-120	-120	-120
12	-120	-120	-120	-120	-120	-120	-120	-120
18	-120	-120	-120	-120	-120	-120	-120	-120
24	-120	-120	-120	-120	-120	-120	-120	-120
30	-120	-120	-120	-120	-120	-120	-120	-120
36	-120	-120	-120	-120	-120	-120	-120	-120
40	-120	-120	-120	-120	-120	-120	-120	-120

Initial Supporting table - P0401: Insufficient EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	580	600	620	640	720	780	880	950
6	-144	-144	-144	-144	-144	-184	-192	-192
8	-144	-144	-144	-144	-144	-184	-192	-192
10	-144	-144	-144	-144	-144	-184	-192	-192
12	-144	-144	-144	-144	-144	-184	-192	-192
18	-144	-144	-144	-144	-144	-184	-192	-192
24	-144	-144	-144	-144	-144	-192	-192	-192
30	-144	-144	-144	-144	-144	-144	-144	-144
36	-144	-144	-144	-144	-144	-144	-144	-144
40	-144	-144	-144	-144	-144	-144	-144	-144

Initial Supporting table - P0401: Insufficient EGRflow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	-256	40	40	40	40	-256	-256	-256
55	-256	40	40	40	40	-256	-256	-256
60	-256	40	40	40	40	-256	-256	-256
65	-256	40	40	40	40	-256	-256	-256
70	-256	40	40	40	40	-256	-256	-256
75	-256	40	40	40	40	-256	-256	-256
80	-256	40	40	40	40	-256	-256	-256
85	-256	40	40	40	40	-256	-256	-256
90	-256	40	40	40	40	-256	-256	-256
100	-256	40	40	40	40	-256	-256	-256
110	-256	40	40	40	40	-256	-256	-256

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	256	5	5	5	5	256	256	256
55	256	5	5	5	5	256	256	256
60	256	5	5	5	5	256	256	256
65	256	5	5	5	5	256	256	256
70	256	5	5	5	5	256	256	256
75	256	5	5	5	5	256	256	256
80	256	5	5	5	5	256	256	256
85	256	5	5	5	5	256	256	256
90	256	5	5	5	5	256	256	256
100	256	5	5	5	5	256	256	256
110	256	5	5	5	5	256	256	256

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient EGRflow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient EGR intrusive test Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient EGR intrusive test Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient EGR intrusive test is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Minimum desired EGRflow

Description: Minimum desired EGR flow above which the insufficient EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	579	580	999	1,000	1,500	1,501	1,600	1,601
50	124	124	124	224	224	224	224	224
55	124	124	124	224	224	224	224	224
60	124	124	124	224	224	224	224	224
65	124	124	124	224	224	224	224	224
70	124	124	124	224	224	224	224	224
75	124	124	124	224	224	224	224	224
80	52	52	52	172	172	172	172	172
85	52	52	52	172	172	172	172	172
90	52	52	52	172	172	172	172	172
100	52	52	52	172	172	172	172	172
110	52	52	52	172	172	172	172	172

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Max OAT threshold for *M2*

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Normal combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Fully Warm Emissions combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the Soft Warm Up combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P140B: Increasing EGR slow response threshold

Description: Threshold for increasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	1	1	1

Initial Supporting table - P140C: Decreasing EGR slow response threshold

Description: Threshold for decreasing EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	1	1	2

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 - Down Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck monitor

Value Units: minimum temperature movement (deg C)
X Unit: Downstream temperature sensor (deg C)

y/x	-40	0	20	40	60	80	100	120
1	2	4	5	5	5	4	3	2

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck monitor

Value Units: minimum temperature movement (deg C)
X Unit: Upstream temperature sensor (deg C)

y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

Initial Supporting table - Cool Down Diagnostic Min Heat to Coolant

Description: KtECTR_P_CDD_HeatToCoolantMin

Value Units: Power (kW)
X Unit: Firing fraction (ratio)
Y Units: Ambient Air Temperature (Deg C)

y/x	0.00	0.25	0.50	0.67	1.00
-9.0	41.0	41.0	41.0	41.0	41.0
0.0	41.0	41.0	41.0	41.0	41.0
10.0	41.0	41.0	41.0	41.0	41.0
20.0	41.0	41.0	41.0	41.0	41.0
50.0	41.0	41.0	41.0	41.0	41.0

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	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

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	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

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	40	40	40	40	40	40	130	180	230
2	40	40	40	40	40	40	130	180	230
3	40	40	40	40	40	40	130	180	230
5	40	40	40	40	40	40	130	180	230
6	40	40	40	40	40	40	130	180	230
8	40	40	40	40	40	40	130	180	230
9	40	40	40	40	40	40	130	180	230
11	40	40	40	40	40	40	130	180	230
12	40	40	40	40	40	40	130	180	230
14	40	40	40	40	40	40	130	180	230
15	40	40	40	40	40	40	130	180	230
17	40	40	40	40	40	40	130	180	230
18	40	40	40	40	40	40	130	180	230
20	40	40	40	40	40	40	130	180	230
21	40	40	40	40	40	40	130	180	230
23	40	40	40	40	40	40	130	180	230
24	40	40	40	40	40	60	130	180	230
26	40	40	40	40	40	60	130	180	230
27	40	40	40	40	40	60	130	180	230
29	40	40	40	40	40	60	130	180	230
30	40	40	40	40	40	60	130	180	230
32	40	40	40	40	40	60	130	180	230
33	40	40	40	40	40	60	130	180	230
35	40	40	40	40	40	60	130	180	230
36	40	40	40	40	40	60	130	180	230
38	40	40	40	40	40	60	130	180	230
39	40	40	40	40	40	60	130	180	230
41	40	40	40	40	40	60	130	180	230
42	40	40	40	40	40	60	130	180	230
44	40	40	40	40	40	60	130	180	230
45	40	40	40	40	40	60	130	180	230

Initial Supporting table - P•2635 Threshold High

47	40	40	40	40	40	60	130	180	230
48	40	40	40	40	40	60	130	180	230

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	-190	-190	-190	-190	-190	-190	-190
2	-190	-190	-190	-190	-190	-190	-190	-190	-190
3	-190	-190	-190	-190	-190	-190	-190	-190	-190
5	-190	-190	-190	-190	-190	-190	-190	-190	-190
6	-190	-190	-190	-190	-190	-190	-190	-190	-190
8	-190	-190	-190	-190	-190	-190	-190	-190	-190
9	-190	-190	-190	-190	-190	-190	-190	-190	-190
11	-190	-190	-190	-190	-190	-190	-190	-190	-190
12	-190	-190	-190	-190	-190	-190	-190	-190	-190
14	-190	-190	-190	-190	-190	-190	-190	-190	-190
15	-190	-190	-190	-190	-190	-190	-190	-190	-190
17	-190	-190	-190	-190	-190	-190	-190	-190	-190
18	-190	-190	-190	-190	-190	-190	-190	-190	-190
20	-190	-190	-190	-190	-190	-190	-190	-190	-190
21	-190	-190	-190	-190	-190	-190	-190	-190	-190
23	-190	-190	-190	-190	-190	-190	-190	-190	-190
24	-190	-190	-190	-190	-190	-190	-190	-190	-190
26	-190	-190	-190	-190	-190	-190	-190	-190	-190
27	-190	-190	-190	-190	-190	-190	-190	-190	-190
29	-190	-190	-190	-190	-190	-190	-190	-190	-190
30	-190	-190	-190	-190	-190	-190	-190	-190	-190
32	-190	-190	-190	-190	-190	-190	-190	-190	-190
33	-190	-190	-190	-190	-190	-190	-190	-190	-190
35	-190	-190	-190	-190	-190	-190	-190	-190	-190
36	-190	-190	-190	-190	-190	-190	-190	-190	-190
38	-190	-190	-190	-190	-190	-190	-190	-190	-190
39	-190	-190	-190	-190	-190	-190	-190	-190	-190
41	-190	-190	-190	-190	-190	-190	-190	-190	-190
42	-190	-190	-190	-190	-190	-190	-190	-190	-190
44	-190	-190	-190	-190	-190	-190	-190	-190	-190
45	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - P2635 Threshold Low

47	-190	-190	-190	-190	-190	-190	-190	-190	-190
48	-190	-190	-190	-190	-190	-190	-190	-190	-190

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-7	10	35	55	71	82
1	40,925	34,748	26,670	14,792	5,289	5,289	5,289

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-7	10	35	55	71	82
1	39,020	34,203	27,904	18,641	11,230	5,302	5,302

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_1 OmsSeq	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_1OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	500.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	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_1OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - Fuel Integral threshold

Description:

y/x	-40	-10	0	9	10
1	1,000	888	725	400	0

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.025	0.028	0.033	0.070	0.100	0.150	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.025	0.028	0.033	0.045	0.100	0.200	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - Ambient correction on distance

Description: Ambient pressure correction for threshold on Distance covered since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Ambient correction on time

Description: Ambient pressure correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Distance since last regeneration

Description: Base value to trigger regeneration for distance covered since last regeneration, function of regeneration priority

Value Units: km
X Unit: enumerative (mission profiles)

Distance since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	1,300	1,300	1,300	1,300	1,300	1,300

Distance since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	1,300	1,300	1,300	1,300	1,300	1,300

Distance since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	1,300	1,300	1,300	1,300	1,300	

Initial Supporting table - DPF Load correction on distance

Description: Map of DPF Load correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	20	40	50	70	75	80	90	95
1	1	1	1	1	1	1	1	1

Initial Supporting table - DPF Load correction on time

Description: Map of DPF Load correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	20	40	50	70	75	80	90	95
1	1	1	1	1	1	1	1	1

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF EffRgnHysHi

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
5	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
10	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
15	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
20	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
25	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
30	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
35	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
40	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
45	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
50	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
55	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
60	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
65	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
70	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
75	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
80	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
90	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
100	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	0	7	10	20	40	60	80	100	120	140	160	180	200	220	240
0	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
5	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
10	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
15	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
20	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
25	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
30	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
35	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
40	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
45	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
50	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
55	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
60	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
65	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
70	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
75	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
80	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
90	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
100	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

Initial Supporting table - DPFResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	10	20	30	40	50	60	70	80
1	1	1	1	1	1	1	1	1

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	-2	-2	-2	-2	-2	-2	-2	-2

Initial Supporting table - EGT FuelReqMaxThreshold

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT FuelReqMinThrsh

Description:

y/x	800	1,000	1,500	2,000	2,500	3,000	3,500	4,000
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT1DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,199.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,200.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT2DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT2 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT4DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT4 Dynamic Check.

y/x	0.0	12.5	15.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT5DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT5 Dynamic Check.

y/x	0.0	15.0	20.0	40.0	60.0	80.0	120.0
800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	950	1,000	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
60	0	1	1	1	1	1	1	1

Initial Supporting table - EnginePointEnable_HC_TempDeviation

Description:

y/x	950	1,000	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - Exhaust Gas Pressure Too Low Threshold

Description: Diagnostic threshold for the exhaust gas pressure too low monitoring. This threshold is function of the exhaust gas flow and of the soot trapped in the DPF

Value Units: kPa
X Unit: l/s
Y Units: % DPF load

y/x	10	20	60	100	140	198	199	200
50	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
300	0	0	0	0	0	0	0	0
450	0	0	0	0	0	0	0	0
600	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0
900	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmllp	CeCMBR_e_SoftExhGasWarmllp	CeCMBR_e_DPF_PN
1	0	0	1	1	1

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	1	1	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	1	1	0	0	

Initial Supporting table - KaFADC_b_SQC_CWA_EnblLink

Description: Engine speed ranges to be learned with CWA before give a positive report to Zero Torque Coordinator.

y/x	0	1	2	3	4	5
1	0	0	0	0	0	0

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh2

Description: Threshold 2 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm]

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh2 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh2 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	0	0	4	4	4	4	4	4

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CWA_DrvInGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp1 0	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: MPa

y/x	0	1	2	3	4
1	5	5	5	5	3

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	214	122	90	90	90

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4
1	-214	-122	-90	-80	-80

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	173	173	173	173	173

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	800	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250
1	30	40	40	60	60	100	110	110	80	80	80	70

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,700	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,950	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
2,800	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
3,200	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	173	173	173	173	173

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-120	-80	-70	-69	-40	0	40	41	42	60	75
-120	0	0	0	0	0	0	0	0	0	0	0
-78	0	0	0	0	0	0	0	0	0	0	0
-77	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Mission profile correction on distance

Description: Curve of Mission profile dependent correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on distance - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1	1	1	1	1		

Initial Supporting table - Mission profile correction on time

Description: Curve of Mission profile dependent correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on time - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1	1	1	1	1		

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	419	590	600	800	1,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,400	4,800
1	0	0	0	13	13	13	13	13	13	13	13	13	13	13	13	13

Initial Supporting table - P0089 Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,250	3,500	4,500
1	67	217	217	117

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Define which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_IAT_Snsr = Intake air temperature, CeFTSR_e_IAT_2_Snsr = Manifold air temperature, CeFTSR_e_MainCatTempSnsr = Upstream DPF temperature)

Value Units: -

y/x	1
1	CeFTSReMainCatTempSnsr

Initial Supporting table - P0191 Rail Pressure Sensor Configuration

Description:

Value Units: -

y/x	1
1	CeFHPG_eR_PSD_oubleTrack

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_1 OmsSeq	CePISR_e_1 2p5msSeq	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_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	500.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_1 2p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_1 2p5msSeq	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_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	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	8.700	9.000	9.200	10.000

Initial Supporting table - P228A Fuel High Pressure Pump efficiency

Description: Efficiency percentage of high pressure pump as function of rail pressure (MPa) and engine speed (rpm).

Value Units: %
X Unit: MPa
Y Units: rpm

y/x	30	80	120	180	200
1,000	98	94	90	83	80
1,250	98	95	91	85	83
1,500	98	95	92	86	84
1,750	98	95	92	87	86
2,000	98	95	92	88	87
2,250	98	95	93	88	87
2,500	95	92	90	86	85
4,000	60	59	58	55	55

Initial Supporting table - P228A Fuel High Pressure Pump efficiency correction

Description: Correction of high pressure pump eficiency as function of fuel temperature (°C).

Value Units: -
X Unit: °C

y/x	-30	-20	20	40	80
1	1	1	1	1	1

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	0	100	190	250
1	15	140	220	290

Initial Supporting table - P228C Positive rail pressure deviation (MU)

Description: Positive rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Initial Supporting table - P228D Negative rail pressure deviation (MU)

Description: Negative rail pressure deviation threshold (MPa) when metering unit is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17

Initial Supporting table - P2293 Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,250	3,500	4,500
1	67	217	217	117

Initial Supporting table - P229A Positive rail pressure deviation (PR)

Description: Positive rail pressure deviation threshold (MPa) when pressure regulator is controlled in closed loop as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	199	200	630	800	1,000	1,200	1,400	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,800	5,400
1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Initial Supporting table - Rail Pressure Control Configuration

Description: CeFHPG_e_MU_And_PR_ModeSel = pressure control can be governed by both metering unit and pressure regulator
CeFHPG_e_MU = pressure control can be governed by metering unit only
CeFHPG_e_PR = pressure control can be governed by pressure regulator only

Value Units: -

y/x	1
1	CeFHPG_e_MU_And_PR_ModeSel

Initial Supporting table - Time since last regeneration

Description: Base value to trigger regeneration for time spent since last regeneration, function of regeneration priority

Value Units: s
X Unit: enumerative (mission profiles)

Time since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	108,000	108,000	108,000	108,000	108,000	108,000

Time since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	108,000	108,000	108,000	108,000	108,000	108,000

Time since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	108,000	108,000	108,000	108,000	108,000	

Initial Supporting table - P0216_ET_CumulEnbl

Description: This calibration provides the capability to select which pulses of the injection pattern have to be monitored
1 -> pulse monitored
0 -> pulse NOT monitored

Value Units: Boolean
X Unit: Pulse ID

P0216_ET_CumulEnbl - Part 1

y/x	CeFULR_e_PulsPI	CeFULR_e_PulsR2	CeFULR_e_PulsR1	CeFULR_e_PulsM	CeFULR_e_PulsA1	CeFULR_e_PulsA2	CeFULR_e_PulsA3
1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00

P0216_ET_CumulEnbl - Part 2

y/x	CeFULR_e_PulsA4	CeFULR_e_PulsP1	CeFULR_e_PulsP2	CeFULR_e_PulsP3	CeFULR_e_PulsP4	CeFULR_e_PulsP5	
1.00	1.00	0.00	0.00	0.00	0.00	0.00	

Initial Supporting table - P0216_PulsWidthErrHi

Description: This error threshold map defines the maximum acceptable positive error [us] between cumulative ET HW and ET SW, depending on the number of pulses driven and monitored.

Value Units: us
X Unit: -
Y Units: Number of pulses

y/x	0.00	1.00	2.00	3.00	4.00	5.00
1.00	32,767.00	32,767.00	32,767.00	32,767.00	32,767.00	32,767.00

Initial Supporting table - P054E_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054E_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P054E_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

P054E_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P054E_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P054EJFM_MinFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	36	36	36	36	36
-10	25	25	25	25	25
0	20	20	20	20	20
20	16	16	16	16	16
50	10	10	10	10	10
70	9	9	9	9	9

Initial Supporting table - P054E EJFM_MinFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	39	39	39	39	39
-10	23	23	23	23	23
0	17	17	17	17	17
20	13	13	13	13	13
50	7	7	7	7	7
70	6	6	6	6	6

Initial Supporting table - P054EJFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	15	15	15	15	15
-10	15	15	15	15	15
0	15	15	15	15	15
20	15	15	15	15	15
50	15	15	15	15	15
70	12	12	12	12	12

Initial Supporting table - P054E zJFM_MinFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	11	11	11	11	11
-10	11	11	11	11	11
0	11	11	11	11	11
20	11	11	11	11	11
50	11	11	11	11	11
70	5	5	5	5	5

Initial Supporting table - P054■E_IFM_MinFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	39	39	39	39	39
-10	29	29	29	29	29
0	20	20	20	20	20
20	13	13	13	13	13
50	12	12	12	12	12
70	11	11	11	11	11

Initial Supporting table - P054E_IFM_MinFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	13	13	13	13	13
-10	11	11	11	11	11
0	7	7	7	7	7
20	8	8	8	8	8
50	4	4	4	4	4
70	3	3	3	3	3

Initial Supporting table - P054■E_IFM_MinFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	36	36	36	36	36
-10	24	24	24	24	24
0	17	17	17	17	17
20	13	13	13	13	13
50	9	9	9	9	9
70	8	8	8	8	8

Initial Supporting table - P054E_IFM_MinFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	13	13	13	13	13
-10	11	11	11	11	11
0	10	10	10	10	10
20	8	8	8	8	8
50	5	5	5	5	5
70	4	4	4	4	4

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054F_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	0	0	0	0

P054F_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmUp	CeCMBR_e_SoftExhGasWarmUp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

P054F_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	0	0	0	0

P054F_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - P054FJFM_MaxFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	52	52	52	52	52
-10	45	45	45	45	45
0	40	40	40	40	40
20	33	33	33	33	33
50	26	26	26	26	26
70	25	25	25	25	25

Initial Supporting table - P054F_JFM_MaxFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	54	54	54	54	54
-10	41	41	41	41	41
0	36	36	36	36	36
20	30	30	30	30	30
50	25	25	25	25	25
70	23	23	23	23	23

Initial Supporting table - P054FJFM_MaxFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the fmaximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	26	26	26	26	26
-10	26	26	26	26	26
0	26	26	26	26	26
20	26	26	26	26	26
50	26	26	26	26	26
70	25	25	25	25	25

Initial Supporting table - P054F JFM_MaxFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	22	22	22	22	22
-10	22	22	22	22	22
0	22	22	22	22	22
20	22	22	22	22	22
50	22	22	22	22	22
70	19	19	19	19	19

Initial Supporting table - P054F_IFM_MaxFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	46	46	46	46	46
-10	35	35	35	35	35
0	30	30	30	30	30
20	25	25	25	25	25
50	23	23	23	23	23
70	22	22	22	22	22

Initial Supporting table - P054F_IFM_MaxFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	24	24	24	24	24
-10	23	23	23	23	23
0	18	18	18	18	18
20	19	19	19	19	19
50	15	15	15	15	15
70	14	14	14	14	14

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	52	52	52	52	52
-10	42	42	42	42	42
0	36	36	36	36	36
20	31	31	31	31	31
50	29	29	29	29	29
70	25	25	25	25	25

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	550	600	800	1,050	1,560
-20	32	32	32	32	32
-10	31	31	31	31	31
0	26	26	26	26	26
20	27	27	27	27	27
50	21	21	21	21	21
70	20	20	20	20	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_1 2p5msSeq	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_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	500.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_1 2p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	3	3	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1 OmsSeq	CePISR_e_1 2p5msSeq	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_1 OOmsSeq	CePISR_e_E ventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P060C_CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	18	29	41	52	64	75	86	98	109	120	132	143	155	166	177	189	200
1	1,453	876	695	559	474	414	370	335	309	287	269	254	240	227	217	208	199

Initial Supporting table - P060C_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	12	24	36	47	59	71	83	94	106	118	130	141	153	165	177	188	200
1	1,867	1,083	755	599	492	423	375	338	309	286	266	251	236	224	213	204	195

Initial Supporting table - P060C_FTD safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on FTD Energizing Time compensation as function of Fuel Rail Pressure.

y/x	12	24	36	47	59	71	83	94	106	118	130	141	153	165	177	188	200
1	1,867	1,083	755	599	492	423	375	338	309	286	266	251	236	224	213	204	195

Initial Supporting table - P060C_Rail Pressure Wave Compensation f(Fuel Rail Pressure, Fuel Quantity)

Description: Safety treshold for the Rail Pressure Wave Compensation on each torque forming pulse as a function of Fuel Rail Pressure and Fuel Quantity

y/x	0	0	0	0	0	0	0	0	0	0	0	0	0
20	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1	1	1	1
160	1	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1	1
200	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
400	1,092	1,071	1,049	4,096	4,096	4,096
550	1,065	1,049	1,033	477	197	207
600	1,055	1,040	1,024	469	193	202
650	1,060	1,043	1,025	469	192	197
700	1,065	1,045	1,025	469	191	192
750	1,059	1,039	1,019	464	191	186
800	1,053	1,033	1,012	458	191	179
850	1,036	1,020	1,005	193	193	193
900	1,018	1,007	997	215	215	215
1,000	995	986	978	238	238	238
1,100	937	930	923	260	260	260
1,800	588	913	597	280	280	280
2,000	726	722	511	300	300	300
2,200	340	340	340	340	340	340
2,400	365	365	365	365	365	365
2,600	390	390	390	390	390	390
4,800	-30	-30	-30	-30	-30	-30

Initial Supporting table - P060C_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	10	15	30	50	70
500	4,096	4,096	4,096	4,096	4,096	4,096	4,096
800	4,096	4,096	4,096	200	200	200	200
1,000	4,096	4,096	4,096	200	100	50	0
1,500	4,096	4,096	4,096	200	50	-150	-150
2,000	4,096	4,096	4,096	200	50	-150	-250

Initial Supporting table - P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	10	15	30	50	70
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P060C_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	12	29	46	63	80	97	115	132	149	166	183	200
1	1,753	955	686	558	473	410	362	332	306	284	259	242

Initial Supporting table - P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	12	24	36	47	59	71	83	94	106	118	130	141	153	165	177	188	200
1	933	541	378	299	246	212	187	169	154	143	133	125	118	112	106	102	97

Initial Supporting table - P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	12	24	36	47	59	71	83	94	106	118	130	141	153	165	177	188	200
1	-933	-541	-378	-299	-246	-212	-187	-169	-154	-143	-133	-125	-118	-112	-106	-102	-97

Initial Supporting table - KaFADC_b_SQA_EnblCMBR

Description: SQA combustion mode enable

KaFADC_b_SQA_EnblCMBR - Part 1

y/x	CeCMBR_e_Normal	CeCMBR_e_DPF_HiO2	CeCMBR_e_DPF_LoO2	CeCMBR_e_FullyWarmEmissions	CeCMBR_e_LNT_DeNOx
1	1	1	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 2

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	CeCMBR_e_StrongExhGasWarmllp	CeCMBR_e_SoftExhGasWarmllp	CeCMBR_e_DPF_PN
1	0	0	1	1	0

KaFADC_b_SQA_EnblCMBR - Part 3

y/x	CeCMBR_e_DPF_RichIdle	CeCMBR_e_DPF_EngPrtct_HiO2	CeCMBR_e_DPF_EngPrtct_LoO2	CeCMBR_e_LNT_EngPrtct	CeCMBR_e_FAD_IdleInjLrn
1	0	1	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 4

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	
1	0	0	0	0	

Initial Supporting table - KaFADC_n_SQC_HiThrsh

Description: Engine speed high threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_HiThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	1,800	1,800	1,450	1,450
1	1,800	1,800	1,500	1,500
2	1,800	1,800	1,650	1,650
3	1,800	1,800	1,650	1,650
4	1,800	1,800	1,800	1,800

KaFADC_n_SQC_HiThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	1,450	1,450	1,450	1,450
1	1,500	1,500	1,500	1,500
2	1,600	1,650	1,650	1,650
3	1,600	1,650	1,650	1,650
4	1,600	1,800	1,800	1,800

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,450	1,450	1,450	
1	1,500	1,500	1,500	
2	1,650	1,650	1,600	
3	1,650	1,650	1,600	
4	1,800	1,800	1,600	

Initial Supporting table - KaFADC_n_SQC_LoThrsh

Description: Engine speed low threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_LoThrsh - Part 1

y/x	CeFADR_e_CWA_DrvlnGrpNotAlwd	CeFADR_e_CWA_DrivelineGrp1	CeFADR_e_CWA_DrivelineGrp2	CeFADR_e_CWA_DrivelineGrp3
0	1,000	1,250	1,000	1,000
1	1,000	1,250	1,000	1,000
2	1,000	1,250	1,000	1,000
3	1,000	1,250	1,000	1,000
4	1,000	1,250	1,000	1,000

KaFADC_n_SQC_LoThrsh - Part 2

y/x	CeFADR_e_CWA_DrivelineGrp4	CeFADR_e_CWA_DrivelineGrp5	CeFADR_e_CWA_DrivelineGrp6	CeFADR_e_CWA_DrivelineGrp7
0	1,200	1,000	1,000	1,000
1	1,200	1,000	1,000	1,000
2	1,200	1,000	1,000	1,000
3	1,200	1,000	1,000	1,000
4	1,200	1,000	1,000	1,000

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CWA_DrivelineGrp8	CeFADR_e_CWA_DrivelineGrp9	CeFADR_e_CWA_DrivelineGrp10	
0	1,000	1,000	1,200	
1	1,000	1,000	1,200	
2	1,000	1,000	1,200	
3	1,000	1,000	1,200	
4	1,000	1,000	1,200	

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4
0	0	100	100	100	100
1	0	100	100	100	100
2	0	100	100	100	100
3	0	100	100	100	100
4	0	100	100	100	100
5	0	100	100	100	100
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	25	50	80	100

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5
1	0	48	70	130	200

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4
0	0	100	100	100	100
1	0	100	100	100	100
2	0	100	100	100	100
3	0	100	100	100	100
4	0	100	100	100	100
5	0	50	50	50	50
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	26	50	80	100

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5
1	0	48	70	130	200

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4
0	0	100	100	100	100
1	0	100	100	100	100
2	0	100	100	100	100
3	0	100	100	100	100
4	0	100	100	100	100
5	0	100	100	100	100
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	25	50	80	100

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5
1	0	48	70	130	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4
0	0	100	100	100	100
1	0	100	100	100	100
2	0	100	100	100	100
3	0	100	100	100	100
4	0	100	100	100	100
5	0	50	50	50	50
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	26	50	80	100

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5
1	0	48	70	130	200

Initial Supporting table - RufCyl Decel

Description: Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	158	148	77	64	41	34	31
2	1,014	689	483	304	207	166	123	118	65	49	32	28	25
4	562	411	312	212	150	133	98	78	50	33	20	22	18
6	1,157	734	469	288	185	132	98	78	60	35	26	22	18
8	1,445	919	580	375	230	167	106	83	69	44	30	25	20
10	2,224	1,341	824	465	296	199	111	91	77	49	36	29	22
12	2,950	1,793	1,093	630	428	263	132	96	85	61	47	33	25
14	3,638	2,236	1,357	796	561	327	173	129	113	76	57	42	30
16	4,118	2,672	1,619	962	693	391	214	159	138	90	68	51	36
18	4,628	3,114	1,887	1,127	825	455	256	189	163	105	79	59	41
20	5,127	3,486	2,146	1,294	958	520	297	218	188	120	89	68	47
22	5,630	3,844	2,416	1,458	1,090	584	338	248	213	134	100	77	52
24	6,153	4,206	2,678	1,624	1,222	647	379	278	238	149	111	86	58
30	7,666	5,265	3,471	2,123	1,619	839	503	367	313	193	143	112	74
40	10,220	7,063	4,795	2,949	2,280	1,160	709	515	439	266	197	155	102
60	15,311	10,618	7,314	4,604	3,526	1,802	1,122	813	690	412	304	242	157
97	20,000	17,308	11,972	7,711	5,801	3,005	1,895	1,369	1,160	686	505	406	260

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	28	25	18	20	16	15	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	25	23	17	19	15	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	22	18	14	16	14	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	19	11	12	14	13	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	19	11	11	9	12	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	19	14	11	9	10	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	20	17	13	11	10	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	22	20	16	13	11	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	26	23	18	15	12	9	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	30	26	21	17	13	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	34	29	23	18	14	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Decel

22	38	32	26	20	15	11	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	42	35	28	22	16	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	53	43	35	27	19	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	73	58	48	36	24	18	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	112	88	72	54	35	24	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	186	143	118	87	54	37	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	155	120	141	77	59	43	34	32
2	931	618	409	271	181	131	100	112	64	51	35	28	26
4	755	490	323	196	135	95	94	83	54	40	27	23	20
6	808	565	431	239	187	155	94	84	54	40	25	23	20
8	1,481	949	607	385	251	175	94	85	61	41	25	24	20
10	2,258	1,437	880	586	377	243	100	85	61	41	29	28	21
12	2,572	1,735	1,153	787	502	311	114	91	78	48	36	32	25
14	2,972	2,028	1,370	988	627	379	140	115	95	62	47	36	29
16	3,355	2,313	1,591	1,081	753	447	153	139	112	77	58	40	32
18	3,741	2,600	1,807	1,231	877	514	167	163	129	92	69	44	36
20	4,144	2,888	2,016	1,380	1,001	582	181	175	145	106	78	48	40
22	4,535	3,175	2,238	1,529	1,114	651	192	182	162	121	88	52	44
24	4,920	3,457	2,451	1,679	1,226	717	205	188	177	136	98	56	48
30	6,120	4,333	3,099	2,125	1,565	921	245	210	208	180	128	68	59
40	8,096	5,770	4,181	2,871	2,132	1,260	309	246	260	253	177	87	78
60	12,070	8,663	6,347	4,365	3,266	1,938	439	317	363	399	276	127	116
97	19,526	14,083	10,393	7,156	5,384	3,210	681	451	557	674	461	200	186

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	29	22	23	20	22	18	32,766	32,768	32,768	32,768	32,768	32,768	32,768
2	26	19	21	18	20	17	32,766	32,768	32,768	32,768	32,768	32,768	32,768
4	22	15	18	16	18	16	32,766	32,768	32,768	32,768	32,768	32,768	32,768
6	18	11	15	13	15	15	32,766	32,768	32,768	32,768	32,768	32,768	32,768
8	18	11	10	11	12	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
10	17	12	10	8	10	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
12	17	15	10	10	10	12	32,766	32,768	32,768	32,768	32,768	32,768	32,768
14	20	19	14	13	11	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
16	25	23	17	16	13	10	32,766	32,768	32,768	32,768	32,768	32,768	32,768
18	29	26	20	18	15	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768
20	33	30	24	21	17	13	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Jerk

22	38	34	27	23	19	14	32,766	32,768	32,768	32,768	32,768	32,768	32,768
24	42	37	30	26	21	16	32,766	32,768	32,768	32,768	32,768	32,768	32,768
30	55	48	40	34	26	20	32,766	32,768	32,768	32,768	32,768	32,768	32,768
40	76	67	57	47	36	28	32,766	32,768	32,768	32,768	32,768	32,768	32,768
60	119	103	91	73	55	38	32,766	32,768	32,768	32,768	32,768	32,768	32,768
97	200	172	153	122	90	60	32,766	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table 3 - RufSCD_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	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
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
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
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	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
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

Initial Supporting table - RufSCD Decel

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
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
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows nearTDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	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
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
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
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	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
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

Initial Supporting table - RufSCD Jerk

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
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
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P2BAA RDP Min Press Drop

Description: This calibration is used to define the minimum expected pressure drop based on pump efficiency after that the injection is commanded. The input of this table is the motorpump average commanded duty cycle before the injection is commanded

Value Units: kPa
X Unit: %

y/x	30	35	40	45	50	54	60	65	70
1	70	54	48	43	39	37	35	33	31

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 2. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 3. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic ■ Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Electronic Control Unit Hardware	B101D	This diagnostic monitors for multiple circuit level failures within the FCM. These include Random Access Memory (RAM), Read Only Memory (ROM), Electrically Erasable Programmable Read-Only Memory (EEPROM) and General Internal Electronic Failures. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B101D.	The RAM Test Algorithm will cycle through the RAM memory map and verify each bit within each byte of RAM is valid. This is accomplished by writing $AA, then reading the value back, if the value is not $AA the DTC will set. If the value is $AAthe algorithm will write $55, then read the value back, if the value is not $55 the DTC will set.	For any RAM Memory Address, the written/ ready memory value # $AA or $55 (for the second pass test)	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is Enabled B101D_34_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	The RAM Test algorithm will RUN once on Power Up until it completes. This test is run in its entirety or until a fault is detected.	Safety Emissions Neutral Diagnostics - Special Type C
			The Flash Test Algorithm will cycle through the Flash memory map, byte by byte. The algorithm will sum each byte. If the sum is not (0) then the DTC is set.	Checksum # 0	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is Enabled B101D_35_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	The Flash Test algorithm will run once at Power up until it completes.	
			Each EEPROM block contains a checksum value, if the contents of the EEPROM Block do not evaluate to the corresponding checksum, three attempts to write to EEPROM will occur before setting the DTC. OR Secondary micro	Three failed Checksums	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_36_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	The EEPROM Test algorithm is RUN every time EEPROM is updated.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			indicates EEPROM memory failure check.					
			Power Supplies fall out of range for greater than 10 ms: 1.2 V 1.8 V 3.3 V 5.0 V Vcc1 Vcc1	1.14 < V< 1.26 1.71 < V< 1.89 3.05 <V< 3.57 4.75 <V< 5.25 3.00 <V< 3.60 1.65 < V< 1.94	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9- 16 V = Any Virtual Network that the ECU participates in is active = TRUE	The Voltage Monitoring Algorithm runs every 10 ms. I2C Communication is tested in Powerup. Memory Diagnostics are run on Powerup.	
			No I2C communication between the Imager and Vision Processing Engine then the DTC is set. Additional Failures for the Imager are monitored (Video time-out or Initization of Imager)	Loss of Communication on IC2 network	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9- 16 V = Any Virtual Network that the ECU participates in is active = TRUE	I2C Communication is tested in Powerup.	
			If there is a missing or bad calibration in the Vision Processing Engine then this DTC is set.	Bad or missing calibrations or Vision Processing Engine	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9- 16 V = Any Virtual Network that the ECU participates in is active = TRUE	Memory Diagnostics are run on Powerup.	
			No SPI communication (or faulty communication)	Loss of Communication on SPI	Vehicle Power Mode	= Any	SPI Communication	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			between the Microcontroller and Vision Processing Engine	network	Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= 9- 16 V = Any Virtual Network that the ECU participates in is active = TRUE	is tested in Powerup.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Electronic Control Unit Software	B101E	This diagnostic monitors for multiple software errors within the FCM. This can include communications, calibrations, or VIN programming. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B101E.	Internal Communications Failure - No interprocessor communications OR Cyclic redundancy check failure within the Video Processing Engine internal data structure OR Video Processing Engine identifies corruption within intenal input signal data storage.	Fault Detected	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101E_3C_ENABLE	= RUN = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	50 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			Default calibrations are still stored and have not been written	Memory space for calibrations are empty or all OxFF	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101E_42_ENABLE	= RUN = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	Once on Power Up.	
			VIN stored in EEPROM contains all bytes with OxFF.	Memory space for VINs are ALL OxFF	Vehicle Power Mode Secondary Parameters Virtual Network condition Manufacturing requirement: MIC Calibration is enabled	= RUN = 9 - 16 V = Any Virtual Network that the ECU participates in is active >= Manufacturing Enable Counter	Once on Power Up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					B101E_47_ENABLE	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Circuit	B1325	Voltage Out of Range. Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within this fault.	Supply Voltage to FCM	< 9.0V (+/- 0.5 V)	Vehicle Power Mode Virtual Network condition Calibration is enabled B1325_03_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active = TRUE	1 second	Safety Emissions Neutral Diagnostics - Special Type C
			Supply Voltage to FCM	> 16.0V (+/-0.5 V)	Vehicle Power Mode Virtual Network condition Calibration is enabled B1325_07_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active = TRUE	0.5 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Camera Module - Long Range Radar Objects Detected Not Plausible	B1A01	Monitors the message 'freshness' for vehicle yaw and vehicle speed provided by the chassis sub-systems. These messages are send to the Front Camera Module via CAN. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	If last valid message associated with yaw or vehicle speed is older than the defined maximum latency on this signal OR If Internal input signals storage check fails Note: This DTC is set after 3 attempts at resetting the Secondary Micro processor and not passing the DTC criteria	Fault Detected.	Vehicle Power Mode Secondary Parameters Virtual Network condition Manufacturing requirement: MIC Calibration is enabled B1A01_00_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active >= Manufacturing Enable Counter = TRUE	Inputs are checked for plausibility at startup and continuously after 0.05 seconds.	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Steering Wheel Controls ACC Gap Up/Down Signal Circuit	B3623	Monitors the 'Lane Keep Assist' Buttons on the steering wheel for Short to Ground and Short to Battery/Open Circuit failures. Stuck buttons are also monitored. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B3623.	The CAN message for the Cruise Control Switches (as reported by the Body Control Module, over GM High Speed CAN) has not been received for more than 10 seconds OR if those switches are sensed to have an indeterminate value. This is monitored for the Gap switches, Speed up/ down, cancel & resume.	Fault detected (as described in the malfuction criteria)	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B3623_08_ENABLE Five second delay after communication enable	= Run = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	10 seconds	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camera Misaligned	B395D	The diagnoistic reports the Video Processing Engine's test for Camera alightment. This diagnoistic also covers end-of-line (EOL) and in-use alignment. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	Camera Alignment is not successful either at EOL / Service Station OR Video Processing Engine reported camera is out of severe alignment	Fault Detected by Video Processing Engine	Vehicle Power Mode Secondary Parameters Virtual Network condition Manufacturing requirement Calibration is enabled B395D_08_ENABLE	= RUN = 9 - 16 V = Any Virtual Network that the ECU participates in is active >= Manufacturing Enable Counter = TRUE	At Power-up and every 0.05 seconds	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communications or Invalid Data with Transmission Controller	DID $05- enm_VBACC_Manual Jnhibit _Reason	This diagnostic monitors critical CAN message frames from the tranmission controller to ensure it is communicating. This diagnostic also monitors Invalid data from the tranmission controller. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID $18.	CAN message ($1F5) from the brake control module not received	No activity of Transmission controller signals for 5 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3.5 s	Safety Emissions Neutral Diagnostics - DID Type
			This diagnostic monitors brake controller CAN frames ($1F5) for the following faults: - Message Invalid - Checksum Invalid -ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communications or Invalid Data with Brake Control Module	DID $18-enm_VBACC_AutomaticjnhibitReason	This diagnostic monitors critical CAN message frames from the brake controller to ensure it is communicating. This diagnostic also monitors Invalid data from the brake controller. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID $18	CAN message ($0C5, $214, $1E9) from the brake control module not received	No activity of brake controller signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = Comms enabled = TRUE	<3s	Safety Emissions Neutral Diagnostics - DID Type
			This diagnostic monitors brake controller CAN frames ($0C5, $1E9, $214) for the following faults: - Message Invalid - Checksum Invalid -ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = Comms enabled = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communications or Invalid Data with Engine Control Module	DID $18-enm_VBACC_AutomaticjnhibitReason	This diagnostic monitors critical CAN message frames from the engine controller to ensure it is communicating. This diagnostic also monitors Invalid data from the brake controller. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID $18.	CAN message ($1C4) from the engine controller not received	No activity of engine controller signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	<3s	Safety Emissions Neutral Diagnostics - DID Type
			This diagnostic monitors engine controller CAN frames ($1C4) for the following faults: - Message Invalid - Checksum Invalid -ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communications or Invalid Data with Inertial Measurement Unit	DID $18-enm_VBACC_Automaticjnhibit_Reason	This diagnostic monitors critical CAN message frames from inertial measurement unit to ensure it is communicating. This diagnostic also monitors Invalid data from the inertial measurement unit. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID $18	CAN message $34C from the inertial measurement unit located within the airbag module is not received	No activity of IMU signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	<3s	Safety Emissions Neutral Diagnostics - DID Type
			This diagnostic monitors the $34C CAN frame for the following faults: - Message Invalid - Checksum Invalid -ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communications or Invalid Data with Steering Angle Sensor	DID $18-enm_VBACC_AutomaticInhibit_Reason	This diagnostic monitors critical CAN message frames from steering angle sensor to ensure it is communicating. This diagnostic also monitors Invalid data from the steering angle sensor. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID $18	CAN message $1E5 from the steering angle sensor located within the electronic steering sensor is not received	No activity of EPS signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	<3s	Safety Emissions Neutral Diagnostics - DID Type
			This diagnostic monitors the $1E5 CAN frame for the following faults: - Parameter Invalid - Checksum Invalid -ARC Invalid - Mask Invalid - Calibration Invalid - SAS Type Incorrect	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Speed CAN Bus Off	DID $18- enm_VBACC_Automaticjnhibit_Reason	Monitors the GM Low Speed CAN bus for a 'Bus-Off Condition. Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled.	CAN Bus Failure Detected	= TRUE	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled U0078_00_ENABLE	= OFF, ACCESSORY, RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	Diagnostic Runs Every 1 second	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Speed CAN Bus Off	U0073	Monitors the GM High Speed CAN bus for a 'Bus-Off Condition. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	CAN Bus Failure Detected Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	= TRUE	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled U0073_00_ENABLE	= OFF, ACCESSORY, RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	Diagnostic Runs Every 1 second	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Body Control Module	U0140	This diagnostic monitors critical CAN message frames from Body Control Module to ensure it is communicating. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	Key CAN messages from the Body Control Module are not received	No activity of BCM signals for 3 seconds	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled U0140_00_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active = TRUE	3 seconds	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This diagnoistic monitors for failures in message validity, alive rolling counter, and signal protection between the Body Control Module and Front Camera Module. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within U0422.	This test is considered failed when the application receives a validity bit set to Invalid for any signal that is used for normal functionality from BCM node. -Transmission engage validity - Brake pedal Mod travel achieved Status validity - Brake pedal initial travel validity - System Power mode validity - Steering wheel angle validity - Steering wheel angle VDA	Any signal invalid for 5 seconds	Vehicle Power Mode Virtual Network condition ECU Operational condition	= RUN = Any Virtual Network that the ECU participates in is active	5 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			A sliding window monitors for Alive Counters that are incorrect or not updated. The following messages are monitored: -Brake Pedal Switch -Cruise Control Switches	3 out of 10 missing or incorrect messages	Vehicle Power Mode Virtual Network condition 5 second delay after Com_enable and voltage in valid range (9 to 16V) Calibration is enabled U0422_72_ENABLE	= RUN = TRUE	0.15 second out of 0.5 second window	
			A sliding window monitors for Data Protection Calculations that are incorrect or not updated. The following messages are monitored:	3 out of 10 missing or incorrect messages	Vehicle Power Mode Virtual Network condition 5 second delay after Com_enable and voltage in valid range (9 to 16V)	= RUN	0.15 second out of 0.5 second window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			-Brake Pedal Switch -Cruise Control Switches		Calibration is enabled U0422_74_ENABLE	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Primary (Sensor 1) IMU Sensor - Lateral Acceleration Circuit	C0186	This monitor cover various aspects of the lateral acceleration 1 sensor circuit Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	Self contious test fails on IMU Chip	Fault Detected	Comm_Enable Operating Voltage DTC Enabled SDM Configuration	= Available = 9.0 - 19.0v = True = True	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic
Primary (Sensor 1) IMU Sensor - Yaw Rate Circuit	C0196	This monitor cover various aspects of the yaw acceleration 1 sensor circuit Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	Self contious test fails on IMU Chip	Fault Detected	Comm_Enable Operating Voltage DTC Enabled	= Available = 9.0 - 19.0v = True	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic
		General Failure Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled (this applies to all failure modes within B101D)	Stuck CPU OR Addressing Error OR Stuck ALU OR Stuck Registers (GPIO, Internal RAM) OR Stuck Clock OR Programming flow/sequence stuck OR Stuck Interrupt/Event Manager	For RAM, ROM and EEPROM errors, CRC is used.	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		RAM Failure	Microprocessor ECC test, checksum test	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		ROM Failure	Microprocessor ECC test, checksum test	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Sensor, Microprocessor or Power supply Failure	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_ASSERT	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_DEASSERT	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	B101D	IMU_IC_RUNCAP_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCAP	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNBIST_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNBIST	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_WRONG_SENSOR	IMU IC reports an incorrect configuration	Fault Detected	SDM Power	= ON	1 occurance	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_INIT_STAT	IMU IC reports internal error on power up	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_CONFIG	IMU does not accept configuration commands for Filter setting, etc	Fault Detected	SDM Power	= ON	2 occurances	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_TEMPERATURE	IMU temperature reading out of range	Fault Detected	SDM Power	= ON	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		INCORRECT_HSCAN_IC_VDD	VDD outside range	= 5 +/- 0.5V	SDM Power Battery Voltage	= ON = Within normal rage	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_VECTOR_DATA_MISMATCH	HSCAN Data to transmit does not match data requested to transmit	Fault Detected	SDM Power	= ON	0.04 s	Safety Non-MIL Emissions Neutral Diagnostic
ECU Software Performance	B101E	IMU Offset Data failure. IMUs have an offselt calculated. This diagnostic will be set if the data for the offset is compromised	Checksum of offset data not correct.	Fault Detected	SDM Power IMU Configuration IMU Rezero	= ON = True = Passed	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Device Power Circuit	B1325	Voltage Below Threshold The fault will set at the 8V threshold, however the emissions neutral default action of disabling adaptive cruise control will occur until < 5V threshold. This is due to the safety case design .	V Battery	Vbatt < 8 V	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	1 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication CAN Bus	U0077	Monitoring to check if the CAN Bus is ON Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	CAN Shorted to Ground OR A fault CAN controller	Fault Detected	Power Mode DTC Calibration Comm Enabled Operating Voltage	= OFF, ACC or RUN = Enabled = Active = 9.0 to 19.0v	5 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Steering Wheel Angle Sensor Signal Message Counter Incorrect (Emissions Neutral Diagnostic)	C1211	This DTC monitors for an error in the Steering Wheel Angle Sensor Signal Message Counter. Emissions neutral default action is to disable auto-stop inhibits and perform auto-stops as originally intended.	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: Steering Wheel Angle ARC Steering Angle Sensor CSUM	 >= 15.00 counts out of >= 18.00 counts >=2.00 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	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Steering Wheel Angle ARC samples every 15.00 milliseconds. Steering Angle Sensor CSUM samples every 15.00 milliseconds.	Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal 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	< -3.8500 g > -3.8500 g (< 0.5 Q 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	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit High	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	> 3.8500 g < 3.8500 g (< 0.5 Q 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	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Performance	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	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed 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 lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit 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	< -3.8500 g > -3.8500 g (< 0.5 Q 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	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit High	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	> 3.8500 g < 3.8500 g (< 0.5 Q 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	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C1254	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. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	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 1 fail time, 50 millisecond update rate	> 0.0800 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity 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) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	> 11.00 volts > 11.00 volts = 1 Boolean = 1 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % > 50.0 Nm > 0.0800 g > 2.0 KPH < 120.0 KPH	raw 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 1 fail time > 4.0 seconds out of region 1 sample time > 5.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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		
			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	> 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity 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	> 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	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 3 fail time > 75.0 seconds out of region 3 sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> 0.1700 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity 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 = 1 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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) 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 % < 50.0 Nm < -0.1700 g > 2.0 KPH < 120.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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		at controller power up intitalization one time (one event/ occurance) OR in one second time loop	Type A, 1 Trips
					service Mode $04 active during one second loop	= FALSE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECU RAM Failure	P0604	Indicates that the TCM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects 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.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECU Processor Integrity Fault	P0606	Indicates that the TCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the TCM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test enabel cailbration: CPU 1 enabled = 0 CPU 2 enabled = 1 CPU 3 enabled = 0 CPU 4 enabled = 0 CPU 5 enabled = 0 CPU 6 enabled = 0 CPU 7 enabled = 0 CPU 8 enabled = 0 (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 >=	5.00		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 0.450 seconds continuous; 50 ms/count in the TCM main processor	
			Checks for ECC (error	3 (results in MIL),		Test is Enabled:	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	5 (results in MIL and remedial action)		1 (If 0, this test is disabled)	depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 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: 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: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							P0606_PSW Sequence Sample f(Loop Time) counts 50 ms/count in the TCM 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: **P0606_Last Seed Timeout f (Loop Time)**	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance , P060C = previous model years P16F3	P060C	The diagnostic monitor is a rationalization of command values: command clutch pressures, command gear, and commanded direction. The monitor is broken up into three fault detection routines, command pressure (tie up) fault detection, command gear/shift fault detection, and commanded direction. The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is	For each combination of clutches which can lead to an output lock: Commanded Clutch PCS Pressure OR For each combination of clutches which can lead to a mult-clutch tie-up: Commanded Clutch PCS Pressure	≥ **Cmnd Tie Up Monitor Output Lock Thresh** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** transfer case range is 4WD Low: ≥ **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** Else ≥ **Cmnd Tie Up Monitor Multi-Clutch Thresh** * **Clutch PCS Pressure Gain** +				Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		rational, one or more of the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and transfer case range	if above criteria met, increment fail timer by 3.125 6.25 ms update rate	**Clutch PCS Pressure Offset**	commanded tie up monitor enable calibration vehicle speed OR commanded tie up fault pending OR (vehicle speed AND monitor enabled in previous loop) High Side Driver 1 On High Side Driver 2 On Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) Number of fill factor conditions below which need to be met Clutch 1 volume fill factor Clutch 2 volume fill factor Clutch 3 volume fill factor Clutch 4 volume fill factor Clutch 5 volume fill factor Clutch 6 volume fill factor SOWC volume fill factor (GF9 only) outout shaft deceleration	= 1 (1 to enable, 0 to disable) > 5.0 KPH = TRUE > 5.0 KPH = TRUE = TRUE = TRUE = FALSE = TRUE > 8.0 KPH = 4 Filled Clutches > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 Transfer case range is 4WD Lo: < -407.6 RPM/sec	when fail timer reaches 100, set DTC >2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		The command direction fault detection is designed to verify the clutches commanded on will result in the commanded direction (e.g. reverse clutches are being commaned on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard.			DTCs Not Fault Active DTCs Not Test Failed This Key On	Else < -151.0 RPM/sec P077C, P077D P0723, P0722		
			Commanded Gear AND at least one of the following: Previous Loop Commanded Gear and current loop commanded OR current commanded gear and previous loop commanded gear OR incorrect downshift fail timer if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate Alternatively, if commanded gear increment invalid commanded gear fail timer	< **Shift Monitor Lowest Allowed Gear** > Current Loop Commanded Gear (i.e a downshift) = a forward, locked gear = a forward, locked gear ± a forward, locked gear >0.0 = NULL	command shift monitor	= 1 (1 to enable, 0 to	when incorrect downshift fail timer reaches 4.63 sec, set DTC when invalid fail timer reaches 4.63 sec, set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			6.25 ms update rate		enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B	 >2.50 sec	
			Criteria based on driver requested range: Drive: An invalid combination of drive clutches commanded on* driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: An invalid combination of reverse clutches commanded on* driver requested range	 **= Illegal Drive Clutch Combinations** = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Reverse Clutch Combinations** = Reverse			Fault pending fail timer **> Clutch Connectivity Wrong Direction FP** Fail time based on driver requested range: **Incorrect Drive Fail Time** **Incorrect Reverse Fail Time** **Incorrect Neutral Fail Time** **Incorrect Park Fail Time** 6.25 ms update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect reverse enable calibration Incrorrect reverse disable calibration Neutral: An invalid combinatio of neutral clutches commanded on* driver requested range Incorrect neural enable calibration Incrorrect neutral disable calibration Park: An invalid combination of reverse clutches commanded on* driver requested range Incorrect park enable calibration Incrorrect park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = **Illegal Park-Neutral Clutch Combinations** = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Park-Neutral Clutch Combinations** = Park = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Current driver requested range (vehicle speed AND vehicle speed OR Fail Timer) clutch connectivity detection enable calibration clutch connectivity monitor enable OR clutch connectivity monitor disable Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On * Note, clutch is considered "on" when the following conditions are met: Clutch commanded	= previous driver requested range > -6.00 KPH > 6.00 KPH > 0.0 = 1 (1 to enable, 0 to disable) = 1 (1 to enable, 0 to disable = 0 (0 to enable, 1 to disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B ≥	≥ **Incorrect Direction Range Change Delay Time** >2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					pressure AND Current clutch pressure command * 0.25 + 1st derivative of pressure command * 0.25 + 2nd derivative of pressure command * -0.25 + 3rd derivative of pressure command * -0.25	**Clutch Connectivity C1 On Threshold OLD** OR ≥ **Clutch Connectivity C2 On Threshold OLD** OR ≥ **Clutch Connectivity C3 On Threshold OLD** OR ≥ **Clutch Connectivity C4 On Threshold OLD** OR ≥ **Clutch Connectivity C5 On Threshold OLD** OR ≥ **Clutch Connectivity C6 On Threshold OLD** OR ≥ **Clutch Connectivity C7 On Threshold OLD** = 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE			increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Output speed direction OR Output speed direction	= FORWARD = REVERSE			**Ratio Monitor Fail Increment Rate (Percent per Loop)** when timer reaches 100, set fault pending	
			Plus following criteria based on driver requested range:					
			Drive:				Fail time based on driver requested range (once fault pending has matured):	
			driver requested range	= Drive				
			Incorrect drive enable calibration	= 1 (1 to enable, 0 to disable)				
			Incrorrect drive disable calibration	= 0 (0 to enable, 1 to disable)			**Incorrect Drive Fail Time**	
			Reverse:				**Incorrect Reverse Fail Time**	
			driver requested range	= Reverse				
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)			**Incorrect Neutral Fail Time**	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)	******************************	******************************	**Incorrect Park Fail Time** 6.25 ms update rate	
			Neutral:		If all conditions below are met, increment ratio monitor fault pending timer:			
			driver requested range	= Neutral				
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	vehicle speed OR	> 0.50 AND < 6.00 KPH		
					vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded)	<-0.50 AND >-6.00 KPH		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)				
			Park:					
			driver requested range	= Park	Monitor Armed	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect park enable calibration Incrorrect park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Measured output speed direction Input speed default direction Current driver requested range based on PRNDL position: driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured ratio AND (Direction By Ratio OR Direction By Clutch Slip) driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured speed ratio AND (Direction By Ratio OR Direction By Clutch Slip) ***************************** Monitor Armed Enables: if Range Shift enable cal: THEN	= REVERSE or FORWARD = REVERSE or FORWARD = previous driver requested range = Reverse > 0.40 > -8.00 = FORWARD = a FORWARD Gear = Drive < -0.40 < 8.00 = REVERSE = REVERSE ***************************** = 0 (1 to enable, 0 to disable)	**≥ Incorrect Direction Range Change Delay Time**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Range Shift State OR if Attained Gear enable cal: THEN Attained Gear ALSO Engine Speed Ratio Monitor enable cal OR Ratio Monitor disable cal ****************************** Direction By Ratio: Direction By Ratio Enable cal (vehicle speed OR vehicle speed) WHEN: Measured output speed direction AND Absolute measured gear ratio THEN Direction by Ratio ELSE WHEN Measured output speed direction AND Absolute measured gear ratio THEN Direction bv Ratio	= Range Shift Complete = 0 (1 to enable, 0 to disable) # Neutral AND # Park > 400 RPM = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) ****************************** = 1 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH = reverse > 4.48 AND < 4.59 = REVERSE = forward > 4.49 AND < 0.66 = FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					Direction by Clutch Slip:			
					C1 clutch slip valid	= TRUE		
					C2 clutch slip valid	= TRUE		
					C5 clutch slip valid	= TRUE		
					C3C4 dual clutch slip valid	= TRUE		
					C3C6 dual clutch slip valid	= TRUE		
					C4C6 dual clutch slip valid	= TRUE		
					Direction by Clutch Slip Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed	> 0.50 KPH		
					OR			
					vehicle speed)	< -0.50 KPH		
					for each clutch: current clutch slip	**Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0)		
					clutch held combination matches a valid gear in:	**Ratio Monitor Clutch States**		
					******************************	******************************		
					General enables:			
					Genral Ratio Monitor Detection enable cal	= 1 (1 to enable, 0 to disable)		
					Transmission Type	= RWD 10 Spd Automatic		
					Service Fast Learn	= FALSE		
					OR		>2.50 sec	
					(Service Fast Learn	= TRUE		
					AND			
					Vehicle Speed)	> 8.0 KPH		
					Hioh Side Driver 1 On	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					High Side Driver 2 On	= TRUE		
					DTCs Not Fault Pending	P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE		
					DTCs Not Fault Active	P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783		
					DTCs Not Test Failed This Key On	P0721, P0722, P0723, P172A, P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type A, 1 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range (TR) Switch Circuit Low Voltage	P0707	Diagnoses the internal range sensor circuit A and wiring for a ground short circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.	< 7.281 % duty cycle > 7.281 % duty cycle < 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean > 9.00 volts = CeTRGD_e_VoltDirctProP	fail time > 0.500 seconds out of sample time > 1.500 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range (TR) Switch Circuit High Voltage	P0708	Diagnoses the internal range sensor circuit A and wiring for a short to voltage circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.	> 92.221 % duty cycle < 92.221 % duty cycle < 0.5 Q impedance between signal and controller power	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration ECM Message Available Communication Check Enable for ECM message Vehicle is in a mode that enables accessory power	= 1 Boolean > 9.00 volts = CeTRGD_e_VoltDirctProP = TRUE = 1.00 Boolean = TRUE	fail time > 0.900 seconds out of sample time > 1.100 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sesnor, and, raw transmission fluid temperature sesnor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	< -6.7 °C			transmission fluid temperature warm up time > **transmission fluid temperature warm up time** seconds	Type B, 2 Trips
					diagnsotic monitor enable	= 1 Boolean		
					P0712 NOT fault active			
					P0713 NOT fault active			
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TFT rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal position	> 5.0 %		
					engine torque	> 50.0 Nm		
					engine speed	> 500.0 RPM		
					vehicle speed	> 10.0 KPH		
					engine coolant temperature	> -40.0 °C		
					engine coolant temperature	< 150.0 °C		
					raw transmission fluid temperature	> -273.0 °C		
					raw transmission fluid temperature	< 150.0 °C		
					P2818 fault active	= FALSE		
					P2818 test fail this key on	= FALSE		
					DTCs not fault active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TFT Warmup Pass P0711 test fail this key on	EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA = FALSE = FALSE		
			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			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	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					intermittent test enable	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					propulsion system active	= TRUE		
			raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, update fail time	< 0.0000 °C	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	fail time > 600.0 seconds battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	< 13.000 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	>284,177.0 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of fail time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed 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 stablity 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	= FALSE = 1 Boolean = FALSE = FALSE = FALSE > 240.0 RPM > 240.0 RPM < 320.0 RPM > 200.0 RPM > 377.0 RPM > 5.0 % < 8,191.9 Nm > 30.0 Nm > 500.0 RPM	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	< 168.0 RPM < 250.0 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_Fourth > CeCGSR_e_CR_First > 250.0 RPM < CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Fourth > 377.0 RPM	fail time > 4.00 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	= FALSE = FALSE = 0 Boolean		
					transmission hydraulic pressure available: engine speed	= 1 Boolean > 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available**	
					DTCs not fault active	EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Performance	P0721	The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	TOSS raw direction 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 cailbration	= 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 > 7.000 seconds out of sample time > 10.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, 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) {}{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 accelerator pedal position hysteresis high accelerator pedal position hysteresis low)}	= FALSE = 1 Boolean # COMPLETE = PARK = NEUTRAL # no inhibit active > CeCGSR_e_CR_First < CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth > 30.0 Nm > 20.0 Nm > 3.0 % > 1.5 % ≤ CeCGSR_e_CR_Fourth > 50.0 Nm > 30.0 Nm > 3.5 % > 2.0 %	fail time >4.00 seconds high gear OR fail time > 3.00 seconds low gear Engine Torque criteria met > 0.15 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR {}{Wheel Speed Rationality Enable AND Transfer Case Range Valid AND Vehicle Speed Fault AND Tease state AND Wheel Speed Sensor Present AND Output Speed calculate from wheel speed} TISS/TOSS has single power supply calibration AND TISS AND TISS) 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	= 1.00 Boolean =TRUE = FALSE != Neutral = TRUE >= 100.00 rpm = 0 Boolean < 8,191.9 RPM > 250.0 RPM = 0 Boolean < 8,191.9 RPM > 3,500.0 RPM = FALSE = FALSE = FALSE = FALSE # 0 Boolean	Wheel Speed Rationality met = 0 s counts down from 0.25 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active 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	= 0 Boolean = TRUE > 5.00 volts = FALSE > 9.00 volts > -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE > 500.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	run crank voltage time > 25 milliseconds engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate Failing criteria depends on below decision tree for failure threshold If 4WD low engaged and wheel speed usage is not enabled Else If Wheel speed usage enabled for failing TOS drop diagnostic Else (Not 4WD and not Wheel Speed usage) If 4WD low is engaged and Wheel speed usage enabled	> 1,755.0 RPM **P0723 Wheel Speed Calc** function of output speed > 650.0 RPM > Above threshold * 2.70	service mode $04 active diagnostic monitor enable transmission engaged state 4WD low state PTC check: PTC enable calibration is FALSE OR (PTC 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 # 0 Boolean = 0 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 > **P0723 (MY21) transmission engaged state time threshold** 4WD low change time > 3.0 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation:			
					PRNDL OR	= CeTRGR_e_PRNDL_Neutral		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional1 N-D transitional		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional4 R-N transitional		
					raw transmission output speed OR	> 250.0 RPM		
					last valid raw transmission output speed	> 250.0 RPM		
					determine if raw transmission input speed is stable:			
					((raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND	< 4,095.9 RPM	raw transmission input speed stability time > 2.00 seconds	
					raw transmission input speed) OR	> 200.0 RPM		
					Wheel speed usage enabled for failing TOS drop diagnostic) OR	= TRUE		
					(TISS/TOSS has single power suoolv calibration	= 0 Boolean	no time required	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND raw transmission input speed)	= 0.0 RPM		
					select delta RPM fail theshold: (4WD low state AND4WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold	 = TRUE = TRUE		
					last valid raw transmission output speed OR valid raw transmission output speed (before drop event)	> 36.0 RPM > 36.0 RPM	raw transmission output speed time > 2.00 seconds	
					Wheel speed usage enabled for failing TOS drop diagnostic AND TOS - Calculated TOS from Wheel Speed	= TRUE > 300.00 rpm		
					last valid raw transmission output speed updates every 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed)	 < 140.0 RPM > 36.0 RPM	stability time > 0.100 seconds	
					transmission hydraulic pressure available: enoine speed	> 500.0 RPM	engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. If the control valve is stuck, the torque converter will drain down, resulting in an excessive K factor above expected value	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> **P0741 GR10 torque converter K factor fail limit** see supporting table			fail count > 4 counts in 75 count sample 25 millisecond update rate	Type A, 1 Trips
					diagnostic monitor enable	= 1 Boolean		
					(TCC stuck off enable	= 1 Boolean		
					OR			
					TCC stuck on enable)	= 1 Boolean		
					hydraulic pressure available:			
					engine speed	> 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting table	
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					engine speed status	# INVALID		
					PRNDL	# PARK		
					PRNDL	# NEUTRAL		
					Commanded Gear	# PARK		
					Commanded Gear	# NEUTRAL		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.0 °C		
					engine speed	> 1,500.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821) P0741 test fail this key on range shift state attained gear slip engine torque accelerator pedal position accelerator pedal position engine acceleration transmission torque converter speed ratio (transmission turbine shaft speed / engine speed) DTCs not fault active DTCs not fault pending	= FALSE = FALSE = range shift complete (steady state gear) < 75.0 RPM > 5.00 Nm > 0.00 % < 100.0 % > -200.0 RPM/sec < 0.900 AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D P0722, P0723, P0716, P0717, P07BF, P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Stuck Off (GR10)	P0746	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k system-level enables:	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE OR	= 1 Boolean		
					(use battery voltage calibration is TRUE AND	= 1 Boolean		
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE OR	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 Boolean		
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C1 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C1 clutch pressured map	= mapped to line pressure, C1 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Stuck On	P0747	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: 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 > 0.60 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: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** 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)	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C1 CB123456R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 10 kPa		
					OR			
					Park/Neutral Stuck on FP	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C1 off going clutch pressure control ramp time out complete	= TRUE		
					AND			
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C1 off going clutch command pressure)	< 350.0 kPa	closed throttle upshift: **C1 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C1 exhaust delay open throttle power on up shift** garage shifts: **C1 exhaust delay garage shift** closed throttle downshift: **C1 exhaust delay closed throttle down shift** negative torque upshift: **C1 exhaust delay negative torque up shift** open throttle downshift: **C1 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,191.8 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for oaraoe shift	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***************************** DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active DTCs not test fail this key on ***************************** 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	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 P172AP172B *****************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					automatic transmission shift due to two conditions: 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 > 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: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Stuck Off (GR10)	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C2 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k 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) TOM 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	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C2 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C2 clutch pressured map	= mapped to line pressure, C2 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Stuck On	P0777	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: 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 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 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: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 10 kPa		
					OR			
					Park/Neutral Stuck on FP	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					****************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C2 off going clutch pressure control ramp time out complete	= TRUE		
					AND			
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C2 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C2 exhaust delay open throttle power on up shift** open throttle upshift: **C2 exhaust delay open throttle power on up shift** garage shifts: **C2 exhaust delay garage shift** closed throttle downshift: **C2 exhaust delay closed throttle down shift** negative torque upshift: **C2 exhaust delay negative torque up shift** open throttle downshift: **C2 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clio**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***************************** DTCs not fault pending	= NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift due to two conditions: 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 > 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: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active 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, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active 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 > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Stuck Off (GR10)	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C3 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k 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) TOM 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	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C3 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C3 clutch pressured map	= mapped to line pressure, C3 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Stuck On	P0797	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: 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 < 50.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.35 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C3 C23457910 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					*****************************	******************************		
					range shift state	± range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 t 1 to enable. 0 to	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C3 off going clutch command pressure)	disable) < 350 kPa	closed throttle upshift: **C3 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C3 exhaust delay open throttle power on up shift** garage shifts: **C3 exhaust delay garage shift** closed throttle downshift: **C3 exhaust delay closed throttle down shift** negative torque upshift: **C3 exhaust delay negative torque up shift** open throttle downshift: **C3 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					****************************** conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift tvoe enable cal for	****************************** # Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HOLD during an automatic transmission shift due to two conditions: 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 > 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: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active 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, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Ω 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 > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. 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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. 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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	>1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)	> 12.5 milliseconds	
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode))	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38,10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	± forward # forward **intermediate speed sensor 1 or 2** **± predicted direction** **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality =enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	± forward **intermediate speed sensor 1 or 2** **# predicted direction** **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	+ forward ± forward **intermediate speed sensor 1 or 2** *t* **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time	> 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	# forward ± forward **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	± forward **intermediate speed sensor 1 or 2** **+ predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	= range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	± forward # forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			raw TOS direction attained gear	± forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = CeTSDD_e_WhlSpdBackUp	unintended decel test system fault time > 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count > 100 counts 25 millisecond update rate	Type A, 1 Trips
			ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	 = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	ECM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TCM range sensor fault time > 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (*default gear option	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage	= 1 Boolean > 5.00 volts	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time *default gear option active occurs when emission MIL active due to transmission default gear	 = TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	> 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	SET TOSS fault = TRUE TOSS latent fault fail count > 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 200 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF [(P0717 or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716or P07C0 or P07BF or P0717fault pending or P172B or P172Aor P0721 fault pending or P1783 or P17CE fault active or	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE	trans range fault time > 10.0 seconds UPDATE trans range latent fault fail count SET trans range fault = TRUE trans range latent fault fail count > 200 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1783 or P17CE fault pending or P172AorP172B test fail this key on or P0721 fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] OR [(P176C orP160E or P0963 or P078F or P0707 fault pending or P18AA fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] SET trans range fault occur = TRUE	= TRUE = TRUE = TRUE = 0 Boolean = 1 Boolean = TRUE = TRUE = 0 Boolean = 1 Boolean		
			tie-up test disable fault tie-up test disable fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up test latent fault fail count)) UPDATE tie-up test latent fault time *default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds	tie-up test latent fault time > 10.0 seconds UPDATE tie-up test latent fault fail count SET tie-up test disable fault = TRUE tie-up test latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occurs when emission		IF			
			MIL active due to		EngineTorqueEstInaccura	= TRUE		
			transmission default gear		te			
					AcceleratorPedalFailure	= TRUE		
					OR			
					CrankSensor_FA	= TRUE		
					OR			
					P2534 fault active	= TRUE		
					OR			
					(P0707 test fail this key	= TRUE		
					on OR			
					P0707 fault active OR	= TRUE		
					P0708 test fail this key on	= TRUE		
					OR			
					P0708 fault active OR	= TRUE		
					P2805 fault active OR	= TRUE		
					P27EE fault active OR	= TRUE		
					P27EB fault active OR	= TRUE		
					P27ED fault active OR	= TRUE		
					P17F7 fault active OR	= TRUE		
					P17F5 fault active OR	= TRUE		
					P17F6 fault active OR	= TRUE		
					P17FC fault active OR	= TRUE		
					P17FA fault active OR	= TRUE		
					P17FB fault active)	= TRUE		
					OR			
					(P0716 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P0717 fault pending, fault	= TRUE		
					active, test fail this key on	= TRUE		
					OR	= TRUE		
					P0721 fault pending, fault			
					active, test fail this key on	= TRUE		
					OR			
					P0722 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P0723 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P077B fault oendina, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR	= TRUE		
					P077C fault pending, fault active, test fail this key on OR	= TRUE		
					P077D fault pending, fault active, test fail this key on OR	= TRUE = TRUE		
					P07BF fault pending, fault active, test fail this key on OR	= TRUE		
					P07C0 fault pending, fault active, test fail this key on OR	= TRUE		
					P172A fault pending, fault active, test fail this key on OR	= TRUE		
					P172B fault pending, fault active, test fail this key on OR	= TRUE		
					P176B fault pending, fault active, test fail this key on OR	= TRUE		
					P176C fault pending, fault active, test fail this key on OR	= TRUE		
					P176D fault pending, fault active, test fail this key on OR	= TRUE		
					P1783 fault pending, fault active, test fail this key on OR	= TRUE		
					P178F fault pending, fault active, test fail this key on OR	= TRUE		
					P17C4 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C5 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C6 fault oendino, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR P17C7 fault pending, fault active, test fail this key on OR P17CC fault pending, fault active, test fail this key on OR P17CD fault pending, fault active, test fail this key on OR P17CE fault pending, fault active, test fail this key on OR P17D3 fault pending, fault active, test fail this key on OR P17D6 fault pending, fault active, test fail this key on) SET tie-up test disable fault occur = TRUE	 = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Acceleration Sensor Value ARC samples every 60.00 milliseconds. Acceleration Sensor Value CSUM samples every 60.00 milliseconds.	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Signal Circuit	P1761	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 date 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. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	alive rolling count error counter update fail time 100 millisecond update rate	> 3 counts	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time up and down shift serial data frame receive occurred 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, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	= FALSE = 1 Boolean > 9.00 volts > 0.100 seconds = TRUE # frame alive rolling count data value = TRUE = FALSE	fail time > 10.00 seconds	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil 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 sesnor 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	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr **P176B ratio calibration = when not REVERSE** see supporting tables **P176B ratio calibration = when REVERSE** see supporting tables ***************************** ≥ **P176B minimum estimated transmission intermediate speed to enable fail evaluation**	fail time > **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count > **P176B intermediate speed sensor fail count threshold** see supporting tables ****************** delay time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					speed / ratio calibration) with transmission input speed 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 ***************************** 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	see supporting tables **P176B minimum transmission input speed to enable fail** **> evaluation** see supporting tables **P176B holding clutch** **= states** see supporting tables = REVERSE OR = 1st thru 10th ****************************** > 240.0 RPM > 36.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 9.00 volts = FALSE	**P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	> 9.00 volts > 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Low	P176C	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.25 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.75 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	+ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** ± FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	*t* **intermediate speed sensor 1 or 2 predicted direction** ± FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** *t* **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** + FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND	**intermediate speed sensor 1 or 2** **± predicted direction** **intermediate speed sensor 1 or 2** **± predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Not Plausible - Forward	P178F	The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error.	intermediate speed sensor 1 direction raw AND attained gear	**intermediate speed sensor 1 or 2** **± predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 1 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** ± FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** **intermediate speed sensor 1 or 2 ± predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	*t* **intermediate speed sensor 1 or 2 predicted direction** **+ intermediate speed sensor 1 or 2 predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	**intermediate speed sensor 1 or 2** *t* **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND	**intermediate speed sensor 1 or 2** **± predicted direction** **intermediate speed sensor 1 or 2** **± predicted direction** # FORWARD	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	# FORWARD ± REVERSE **P17C5 P17D3 intermediate speed** **> sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ± 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_Dual SpdSnsr > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds 6.26 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Direction Not Plausible - Forward	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.	intermediate speed sensor 2 direction raw AND attained gear	**intermediate speed sensor 1 or 2** **± predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 2 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	*t* **intermediate speed sensor 1 or 2 predicted direction** + FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time	> 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** * FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	t **intermediate speed sensor 1 or 2 predicted direction** # **intermediate speed sensor 1 or 2 predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0721 Fault Active range shift state (auto trans shift complete) enable time	= FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed	**intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.250 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P17CD fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CC fault active OR P17CC test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.750 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P17CC fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CD fault active OR P17CD test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction when transitional period = FALSE AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	± FORWARD # REVERSE > 225.0 RPM	determine update rate: 6.26 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode $04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type calibration (senor type is directional) P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= 1 Boolean = FALSE = 1 Boolean # 0 counts = CeTISR_e_Directional = 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	fail time > 3.500 seconds out of sample time > 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	± FORWARD # REVERSE **> P17C5 P17D3 intermediate speed sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ± 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor 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) with	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** see supporting tables = **P17D6 ratio calibration when REVERSE** see supporting tables ***************************** ≥ **P17D6 minimum estimated transmission intermediate speed to enable fail evaluation** see supporting tables	fail time > **P17D6 intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count > **P17D6 intermediate speed sensor fail count threshold** see supporting tables ****************** delay time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission input speed	≥ **P17D6 minimum transmission input speed to enable fail evaluation** see supporting tables	**P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with	= **P17D6 holding clutch states** see supporting tables		
					with attained gear	= REVERSE OR = 1st thru 10th		
					******************************	******************************		
					transmission input speed	> 240.0 RPM		
					transmission output speed	> 36.0 RPM		
					neutral idle mode	= nuetral idle mode ON		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P17CC fault active	= FALSE		
					P17CD fault active	= FALSE		
					battery voltage	> 9.00 volts		
					service fast learn active	= FALSE		
					run crank voltage	> 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission hydraulic pressure available: engine speed	> 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the TCM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	99 failures out of 240 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the TCM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	280 failures out of280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive 2 ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck Off (GR10)	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C4 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM			fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update	Type A, 1 Trips
					ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk		
					system-level enables:			
					use battery voltage calibration is FALSE OR	= 1 Boolean		
					(use battery voltage calibration is TRUE AND	= 1 Boolean		
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE OR	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 Boolean		
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C4 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C4 clutch pressured map	= mapped to line pressure, C4 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: 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 < 50.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 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: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to GR10 C4 C2346781OR clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C4 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C4 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C4 exhaust delay open throttle power on up shift** garage shifts: **C4 exhaust delay garage shift** closed throttle downshift: **C4 exhaust delay closed throttle down shift** negative torque upshift: **C4 exhaust delay negative torque up shift** open throttle downshift: **C4 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	= 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 > 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: 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 diacmostic monitor to			

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
					execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Stuck Off (GR10)	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C5 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM			fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update	Type A, 1 Trips
					ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full			procedure active	= FALSE Boolean		
		torque holding capacity at the given engine			hydraulic pressure available	= TRUE		
		crankshaft torque, to maintain true gear			(hydraulic pressure OR	> 10.00 kPa		
		ratio. When the clutch pressure control solenoid is failed			Clutch Stuck on in Park/ Neutral fault pending OR	= TRUE		
		hydraulically off, the clutch does not			Neutral Staging Line Pressure Disable)	= TRUE		
		maintain holding capacity at any engine			*****************************	*****************************		
		crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control			enable C5 clutch slip speed fail compare when:			
		solenoid test is suspended if the higher			((startle mitigation active OR	= FALSE		
		level safety startle mitigation function is			(startle mitigation active AND	= TRUE		
		active. The safety startle mitigation function is triggered when a sudden vehicle			startle mitigation gear)) (see startle mitigation active NOTE below)	# initial startle mitigation gear		
		deceleration occurs due to a clutch pressure control			unintended deceleration fault pending OR	= FALSE		
		solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is			unintended deceleration fault pending enable cal is FALSE (startle mitigation)	= 0 (0 to enable, 1 to disable)		
		electrically functional, which must take priority over any clutch			clutch steady state adaptive active	= FALSE		
		pressure control solenoid stuck off diagnostic monitor. All			(transmission output shaft speed OR	> 36.0 RPM		
		clutch pressure control			accelerator Dedal oosition	> 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control solenoid.			OR engine speed OR transmission input shaft speed)	 > 1,000.0 RPM > 350.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C5 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Stuck On	P2724	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: 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 milliscond update	< 50.00 RPM < 50.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 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: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C5 C1356789 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					*****************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C5 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C5 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C5 exhaust delay open throttle power on up shift** garage shifts: **C5 exhaust delay garage shift** closed throttle downshift: **C5 exhaust delay closed throttle down shift** negative torque upshift: **C5 exhaust delay negative torque up shift** open throttle downshift: **C5 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type)	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND shift type enable cal for oaraoe shift	= FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					automatic transmission shift due to two conditions: 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 > 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: 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			

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
					The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch solenoid, or 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	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Stuck Off (GR10)	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C6 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	ick-kiek-k-k-kiek-kit-k-kiek-k-k-k-k-kick-kick-k-k-k-k 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) TOM 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	kkkkkkkk-kkkkkkkkkkkkkkkkkkkkkk = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** enable C6 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 GR10 C4567891OR clutch pressure control solenoid.			engine speed OR transmission input shaft speed) C6 clutch slip speed valid C6 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) range shift state ****************************** DTCs not fault pending DTCs not fault active	> 1,000.0 RPM > 350.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C6 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 = range shift complete ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 0.500 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Stuck On (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	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 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 > 0.60 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: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C6 C4567891OR 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 (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) **************************** range shift state diagnostic clutch test transmission output shaft speed ((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > 10 kPa =TRUE =TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C6 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C6 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C6 exhaust delay open throttle power on up shift** garage shifts: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C5 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***************************** DTCs not fault pending	= NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active DTCs not test fail this key on ****************************** 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	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 P172AP172B ******************************		

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

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
					transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR 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	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR 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	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A 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.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC or GRW 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.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5C1356789 clutch pressure or CVT C1 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C2346781OR clutch or CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: 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	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Sensor A/B Correlation	P2805	Internal range sensor A is wired independently to the TCM while internal range sensor B is wired independently to the ECM. The monitor diagnoses the internal range sensor A PWM duty cycle by comparing the raw sensor A value against the raw sensor B adjusted value, to verify signals are consistent, or determine the TCM internal range sensor A does not correlate to the ECM internal range sensor B. The ECM transmits internal range sensor B raw PWM to the TCM over the serial data bus.	ABS((TCM internal range sesnorA+ ECM internal range sesnor B raw adjusted for high or low time) - 100 %)) Increment fail and sample time, update rate 25 milliseconds	> 4.849 % duty cycle	diagnostic monitor enable	= 1 Boolean	PWM fail time > 1.000 seconds out of sample time > 1.500 seconds	Type A, 1 Trips
					P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM ECM internal range sesnor B fault active	= FALSE = FALSE = FALSE = TRUE = FALSE		
					battery voltage	> 9.00 volts	battery voltage time > 1.000 seconds	
					ABS(TCM internal range sesnor A current loop value - TCM internal range sesnor A previous loop value), update TCM internal range sesnor A stablity time, update rate 25 milliseconds	< 1.001 % duty cycle	TCM internal range sesnor A stability time > 1.000 seconds	
					ABS(ECM internal range sesnor B current loop value - ECM internal range sesnor B previous loop value), update ECM internal range sesnor B stablity time, update rate 25 milliseconds	< 1.001 % duty cycle	ECM internal range sesnor B stability time > 1.000 seconds	
					TCM internal range sesnor A stability time met OR ECM internal range sesnor B stability time met			
					ECM internal range sesnor B raw adjusted for	= ABS(ECM internal range sesnor B raw -		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					high or low time Vehicle is in a mode that enables accessory power	0.000 %) = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 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 > 0.60 seconds out of sample time > 0.65 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			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	> 5.00 volts	> 25 milliseconds	
					OR			
					accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR			
					Power Mode)	= ACCESSORY		
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 1)	= ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 2)	= ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 3)	= ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Performance /Stuck Off - GR10 Specific	P2817	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a “lock” mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an “on” mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the “lock” mode slip speed is excessive, or, when the ‘on” mode slip speed error is excessive.	if use TCC slip speed error OR 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) ≥ **P2817TCC stuck off fail TCC slip speed** = 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 % > 500.0 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 > 4.000 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 > **engine speed time for transmission hydraulic pressure available**	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
						= FALSE		
					(PTO active OR PTO disable calibration)	= 0 Boolean		
					accelerator pedal position	> 8.0 %		
					accelerator pedal position	< 99.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.0 °C		
					engine torque	> 50.0 Nm		
					engine torque	< 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR TCC control mode)	= ON mode (controlled slip mode) = LOCK		
					attained gear	≥ CeCGSR_e_CR_Second		
					attainded gear slip	> 75.00 RPM		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		
					DTCs not fault pending	P0722, P0723, P0716, P0717, P07BF, P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. This is evaluated by monitoring slip across the torque converter in two cases: 1) during low speed shifts into drive and reverse while monitoring engine speed and 2) outside of garage shifts by monitoring engine speed decel and torque for potential engine stall	ABS(TCC slip speed) (set point engine speed - actual engine speed) (maximum engine speed during garage shift - current engine speed) engine torque update TCC stuck on fail time garage shift	< 40.0 RPM > 50.0 RPM > 50.0 RPM > 200.0 Nm	MIN(commanded or attained gear turbine speed) active clutch control freewheel-to-lock shift lock-to-freewheel shift (commanded gear AND output speed) OR (commanded gear AND output speed) primary oncoming clutch command primary oncoming control state (TCC stuck off enable OR TCC stuck on enable)	< desired engine speed - 50.0 RPM = garage shift = FALSE = FALSE = REVERSE < 15.0 RPM > FIRST GEAR > -15.0 RPM > Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset** # clutch fill = 1 Boolean = 1 Boolean	TCC stuck on fail time garage shift **P2818TCC stuck on fail time garage > shift -GR10** update fail count when: fail count > 3 counts set DTC fault active 25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage	> 9.00 volts		
					run crank voltage	> 9.00 volts		
					diagnostic monitor enable	= 0 Boolean	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	
					PRNDL commanded gear PRNDL commanded gear	# PARK # PARK # NEUTRAL # NEUTRAL		
					TCC command mode (PTO active OR PTO disable calibration)	= OFF = FALSE = 0 (0 to enable, 1 to disable)		
					transmission fluid temperature transmission fluid temperature	> -6.66 °C < 130.00 °C		
					engine torque engine torque	> -25.0 Nm < 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration)	> 300.0 RPM < 1,000.0 RPM < 5.0 % = FALSE = FALSE = 0 (0 to enable, 1 to disable)		
					(misfire requests TCC off OR	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					misfire TCC off calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request vehicle speed (not garage shift) minimum turbine speed DTCs not fault pending DTCs not fault active	= 0 (0 to enable, 1 to disable)Boolean = FALSE = FALSE < 4.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		
			active clutch control ABS(TCC slip speed) engine torque [(set point engine speed - actual engine speed) OR	# garage shift < 30.0 RPM > 90.0 Nm > 200.0 RPM			TCC stuck on stall pending time > **P2818TCC stuck on fail time stall pending - GR10** when: fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			rate of change of engine speed] update TCC stuck on stall pending time	< -2,000 RPM/second			> 4 counts set DTC fault active 25 millisecond update rate	
					MIN(commanded or attained gear turbine speed)	< desired engine speed - 50.0 RPM		
					active clutch control	# garage shift		
					freewheel-to-lock shift	= FALSE		
					lock-to-freewheel shift	= FALSE		
					(commanded gear AND output speed) OR (commanded gear AND output speed)	= REVERSE < -999,999.0 RPM > FIRST GEAR > 0.0 RPM		
					primary oncoming clutch command	> Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset**		
					(TCC stuck off enable OR TCC stuck on enable)	= 1 Boolean = 1 Boolean		
					battery voltage	> 9.00 volts		
					run crank voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					diagnostic monitor enable	= 0 Boolean	run crank voltage time > 0.100 seconds	
					PRNDL	# PARK		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		
					commanded gear	# NEUTRAL		
					TCC command mode	= OFF		
					(PTO active OR PTO disable calibration)	= FALSE = 0 (0 to enable, 1 to disable)		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.00 °C		
					engine torque	> -25.0 Nm		
					engine torque	< 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed	> 300.0 RPM		
					engine speed	< 1,000.0 RPM		
					accelerator pedal position	< 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR driver shift mode calibration)	= FALSE = 0 (0 to enable, 1 to disable)		
					(misfire requests TCC off OR misfire TCC off	= FALSE = 0 (0 to enable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TOO solenoid pulse request vehicle speed minimum turbine speed DTCs not fault pending DTCs not fault active	disable)Boolean = FALSE = FALSE < 15.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0, P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (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_HSD1 (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_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 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 > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid J Stuck Off (GR10)	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition. When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving	(gear ratio AND gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	> 3.000 < 2.960 > 0.980 < 1.020 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00	****************************** 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) TOM 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	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean	if engine torque <20.0 Nm fail time < 0.50 sec else fail time = 0.25 seconds 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and the control system is commanding a different gear, the solenoid fault can be detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve solenoid. For GR10 non-ETRS applications, the stuck off solenoid can be detected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse. If the driver attempts unsucessfully to accelerate and then again shifts into drive, this 2nd shift triggers a neutral test which monitors input speed to confirm that the default disable solenoid is stuck off			service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic line pressure	> 10.00 kPa		
					*****************************	******************************		
					conditions to trigger start of test:			
					(clutch control solenoid test state OR clutch control solenoid test state)	= Tie Up Test Active = Tie Up Test Hold		
					Offgoing clutch stuck on test result (for any clutch)	= Test Failing		
					Default disable stuck off enable cal for tie-up events	= 1 (1 to enable, 0 to disable)		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear)		
					*****************************	******************************		
					conditions needed through duration of test:			
					attained gear	= NEUTRAL		
					transmission output speed	> 36.00 RPM		
					driver direction reauest	= FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					*****************************	*****************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			(gear ratio AND gear ratio) OR (gear ratio AND	> 3.000 < 2.960 > 0.980			if engine torque <20.0 Nm fail time <0.50 sec else	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			gear ratio)	< 1.020			fail time = 0.25 seconds	
			(C1 clutch slip speed	< 40.00				
			C2 clutch slip speed	< 40.00			6.25 milliscond update	
			C3 clutch slip speed	< 40.00				
			C4 clutch slip speed	< 40.00	******************************	******************************		
					system-level enables:			
			OR					
					use battery voltage calibration is FALSE	= 1 Boolean		
			C3 clutch slip speed	< 40.00				
			C4 clutch slip speed	< 40.00				
			C5 clutch slip speed	< 40.00	OR			
			C6 clutch slip speed)	< 40.00				
			update fail time 6.25 milliscond update		(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					hydraulic pressure available	= TRUE		
					(hydraulic line pressure OR	> 10.00 kPa		
					Clutch Stuck on in Park/ Neutral Fault Pending OR	= TRUE		
					Neutral Staging Line Pressure Disable)	=TRUE		
					*****************************	******************************		
					conditions to trigger start of test:			
					clutch control solenoid test state	= Neutral Test State		
					Default disable stuck off enable cal for startle events	= 0 (1 to enable, 0 to disable)		
					Startle Mitigation Active	= TRUE		
					******************************	******************************		
					conditions needed through duration of test:			
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear)		
					attained gear	= NEUTRAL		
					driver direction request	= FORWARD		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			Input speed decel test: transmission input speed deceleration neutral test to set DTC on next shift into drive:	> **P2820 GR10 hydraulic default input speed deceleration threshold**			decel time: > 0.05 sec decel observed within **P2820 GR10 hydraulic default at launch test window**	

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
			transmission input speed	<100 RPM			neutral test fail time > 0.10	
					******************************	******************************	6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts		
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts		
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** conditions needed to trigger decel test: Driver direction change request Driver requested direction default disable stuck off at launch enable cal ETRS system type deceleration test on previous shift into drive failed P2820 Test Passed this Key on OR (Multiple pass cal AND Trans output speed since last pass) Accelerator pedal position transmission input speed transmission output speed ***************************** conditions needed throuoh duration of decel	 > 10.00 kPa = TRUE = TRUE ***************************** = TRUE = FORWARD = 1 (1 to enable, 0 to disable) = CeTRGR_e_NoETRS (CeTRGR_e_NoETRS to enable) = TRUE = FALSE = 1 (1 to enable, 0 to disable) > 36.0 RPM < 2.5 % < 900 RPM < 100 RPM *****************************	>0.10 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					test:			
					commanded gear	= NEUTRAL		
					Driver direction request	= FORWARD		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd)		
					transmission input speed	< 900 RPM		
					transmission output speed	< 100 RPM		
					******************************	******************************		
					conditions needed to trigger neutral test:			
					decel test failed	= TRUE	All conditions met for > 1.00 sec, increment count, count > 1 , set FP	
					transmission output speed	< 100 RPM		
					attained gear direction	= FORWARD		
					brake pedal position	< 5.00 %		
					park brake status	# APPLIED		
					park brake status	≠ APPLY IN PROGRESS		
					accelerator pedal position	> 10.0 %		
					Driver direction change request	= TRUE		
					driver requested direction	= FORWARD		
					transmission input speed	> 100 RPM		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this kev	P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on	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		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732, P2818, P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 9.00 volts and < 32.00 volts > 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 > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	This DTC monitors for an error in communication with the Engine Stall Prevention Active Signals.	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.		Engine Stall Saver Active ARC samples every 35.00 milliseconds.	Type B, 2 Trips
			Engine Stall Saver Active ARC	>=8.00 counts out of >= 10.00 counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
					Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the TCM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the TCM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 480.01 milliseconds) 800.01 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 > 11.00 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If 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 > 11.00 Volts >= 8.00 Volts Enabled >=11.00 Volts		

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the Engine Control Module.	Message is not received from controller for Message $0BE: Message $0C9: Message $18E: Message $191: Message $1A1: Message $1A3: Message $1AA: Message $1BA: Message $1DF: Message $1F7: Message $287: Message $3D1: Message $3E9:	> 500.00 milliseconds > 500.00 milliseconds > 500.00 milliseconds >10,000.00 milliseconds > 500.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on 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	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $4A3:	>10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled			
			Message $4C1:	>10,000.00 milliseconds	Low voltage disable mode: OBDII			
			Message $4F1:	>10,000.00 milliseconds	If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
			Message $589:		If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Anti-Lock Brake System (ABS) Control Module (Emission MIL Diagnostic)	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module.	Message is not received from controller for Message $0C1 Message $0C5 Message $1E9 Message $1FC Message $22A Message $2F9	> 500.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds > 500.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on 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	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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 > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Power Steering Control Module (Emissions Neutral Diagnostic)	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module. Emissions neutral default action is to disable auto-stop inhibits and perform auto-stops as originally intended.	Message is not received from controller for Message $1E5	>10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on 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	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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 > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Body Control Module (Emissions Neutral Diagnostic)	U0140	This DTC monitors for a loss of communication with the Body Control Module. Emissions neutral default action is the calculated air conditioning compressor normalized load is set to 0.	Message is not received from controller for Message $0F1 Message $12A Message $1F1 Message $1F3 Message $4E1 Message $4E9	> 500.00 milliseconds >10,000.00 milliseconds > 10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on 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	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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 > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A.	Message is not received from controller for Message $3CF	 >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on 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	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: 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 > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation	U3023	Detect a Power A vs RuncCrank correlation error	Power A - RunCrank - Voltage	> 3.00	PowerA- RunCrank Correlation monitoring enable = TRUE Battey Present RunCrank Active Starter Motor NOT Engaged	Diagnostc is 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	40.00 failures out of 50.00	Type A, 1 Trips

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - 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_1OmsSeq	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_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	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_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	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_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	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_1OOmsSeq	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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - 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_1OmsSeq	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_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	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_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	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_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	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_1 OOmsSeq	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 - 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_1OmsSeq	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_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	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_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	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_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	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_1OOmsSeq	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 - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.500	1.000	0.750	0.750	0.750

Initial Supporting table - 01 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	690	690	690	690	690

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - 02 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	500	500

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

Initial Supporting table - C3 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	575	800

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - 04 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	400	650	750	800	900

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C5 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	600	700	750	900

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C6 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	350	650	750	800	950

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

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	400	400	320	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press PD Shifts

Description: Oncoming clutch clip pressure for open throttle power down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	500	600	750	750	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

XUnit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_Directionllnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
XUnit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
XUnit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)
X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)
X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	0	0	0	0	0	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	277	277	4,096	277	277	290	277
CeTRMR_e_C2_Clutch	264	264	264	4,096	264	264	274
CeTRMR_e_C3_Clutch	92	92	92	92	4,096	92	177
CeTRMR_e_C4_Clutch	452	452	452	452	452	4,096	452
CeTRMR_e_C5_Clutch	114	114	114	114	563	114	4,096
CeTRMR_e_C6_Clutch	198	198	198	198	198	211	198
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	277	4,096	4,096	4,096	4,096	4,096	277
CeTRMR_e_C2_Clutch	264	4,096	4,096	264	264	274	4,096
CeTRMR_e_C3_Clutch	92	4,096	92	4,096	92	177	4,096
CeTRMR_e_C4_Clutch	1,493	4,096	452	1,493	4,096	452	452
CeTRMR_e_C5_Clutch	114	4,096	114	563	114	4,096	563
CeTRMR_e_C6_Clutch	4,096	4,096	198	211	211	198	198
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	290	277	277	302	277	277	290
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	264	274	264	274
CeTRMR_e_C3_Clutch	92	1,745	92	4,096	4,096	4,096	177
CeTRMR_e_C4_Clutch	4,096	452	1,962	4,096	452	1,493	4,096
CeTRMR_e_C5_Clutch	114	4,096	114	563	4,096	1,174	4,096
CeTRMR_e_C6_Clutch	211	198	4,096	211	198	4,096	322
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
CeTRMR_e_C1_Clutch	290	277	277	4,096	277	277	290
CeTRMR_e_C2_Clutch	264	264	264	264	4,096	264	264
CeTRMR_e_C3_Clutch	92	92	92	92	92	4,096	92
CeTRMR_e_C4_Clutch	4,096	452	452	452	452	452	4,096
CeTRMR_e_C5_Clutch	114	114	114	114	114	563	114
CeTRMR_e_C6_Clutch	4,096	198	198	198	198	198	211
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
CeTRMR_e_C1_Clutch	277	277	4,096	4,096	277	290	277
CeTRMR_e_C2_Clutch	274	264	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	177	92	4,096	92	4,096	92	1,745

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	452	1,493	4,096	452	452	4,096	452
CeTRMR_e_C5_Clutch	4,096	114	4,096	114	563	114	4,096
CeTRMR_e_C6_Clutch	198	4,096	4,096	198	198	211	198
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
CeTRMR_e_C1_Clutch	277	302	277	277	290	290	277
CeTRMR_e_C2_Clutch	4,096	264	274	264	274	264	264
CeTRMR_e_C3_Clutch	92	4,096	4,096	4,096	177	92	92
CeTRMR_e_C4_Clutch	1,962	4,096	452	1,493	4,096	4,096	452
CeTRMR_e_C5_Clutch	114	563	4,096	1,174	4,096	114	114
CeTRMR_e_C6_Clutch	4,096	211	198	4,096	322	4,096	198
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	274	264
CeTRMR_e_C3_Clutch	92	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	452	452	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	114	4,096	4,096	563	563	4,096	1,174
CeTRMR_e_C6_Clutch	4,096	198	198	211	211	322	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Cl utch	4,096	4,096	459	290	277	302	
CeTRMR_e_C2_Clutch	302	280	760	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	177	4,096	1,745	4,096	4,096	
CeTRMR_e_C4_Clutch	1,493	4,096	4,096	4,096	1,962	4,096	
CeTRMR_e_C5_Cl utch	4,096	4,096	4,096	4,096	4,096	1,962	
CeTRMR_e_C6_Cl utch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	103	103	4,096	103	103	107	103
CeTRMR_e_C2_Clutch	98	98	98	4,096	98	98	102
CeTRMR_e_C3_Clutch	34	34	34	34	4,096	34	66
CeTRMR_e_C4_Clutch	167	167	167	167	167	4,096	167
CeTRMR_e_C5_Clutch	42	42	42	42	209	42	4,096
CeTRMR_e_C6_Clutch	73	73	73	73	73	78	73
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	103	4,096	4,096	4,096	4,096	4,096	103
CeTRMR_e_C2_Clutch	98	4,096	4,096	98	98	102	4,096
CeTRMR_e_C3_Clutch	34	4,096	34	4,096	34	66	4,096
CeTRMR_e_C4_Clutch	553	4,096	167	553	4,096	167	167
CeTRMR_e_C5_Clutch	42	4,096	42	209	42	4,096	209
CeTRMR_e_C6_Clutch	4,096	4,096	73	78	78	73	73
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	107	103	103	112	103	103	107
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	98	102	98	102
CeTRMR_e_C3_Clutch	34	647	34	4,096	4,096	4,096	66
CeTRMR_e_C4_Clutch	4,096	167	727	4,096	167	553	4,096
CeTRMR_e_C5_Clutch	42	4,096	42	209	4,096	435	4,096
CeTRMR_e_C6_Clutch	78	73	4,096	78	73	4,096	119
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
CeTRMR_e_C1_Clutch	107	103	103	4,096	103	103	107
CeTRMR_e_C2_Clutch	98	98	98	98	4,096	98	98
CeTRMR_e_C3_Clutch	34	34	34	34	34	4,096	34
CeTRMR_e_C4_Clutch	4,096	167	167	167	167	167	4,096
CeTRMR_e_C5_Clutch	42	42	42	42	42	209	42
CeTRMR_e_C6_Clutch	4,096	73	73	73	73	73	78
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
CeTRMR_e_C1_Clutch	103	103	4,096	4,096	103	107	103
CeTRMR_e_C2_Clutch	102	98	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	66	34	4,096	34	4,096	34	647

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	167	553	4,096	167	167	4,096	167
CeTRMR_e_C5_Clutch	4,096	42	4,096	42	209	42	4,096
CeTRMR_e_C6_Clutch	73	4,096	4,096	73	73	78	73
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
CeTRMR_e_C1_Clutch	103	112	103	103	107	107	103
CeTRMR_e_C2_Clutch	4,096	98	102	98	102	98	98
CeTRMR_e_C3_Clutch	34	4,096	4,096	4,096	66	34	34
CeTRMR_e_C4_Clutch	727	4,096	167	553	4,096	4,096	167
CeTRMR_e_C5_Clutch	42	209	4,096	435	4,096	42	42
CeTRMR_e_C6_Clutch	4,096	78	73	4,096	119	4,096	73
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	102	98
CeTRMR_e_C3_Clutch	34	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	167	167	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	42	4,096	4,096	209	209	4,096	435
CeTRMR_e_C6_Clutch	4,096	73	73	78	78	119	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Cl utc h	4,096	4,096	170	107	103	112	
CeTRMR_e_C2_Clutc h	112	104	281	4,096	4,096	4,096	
CeTRMR_e_C3_Clutc h	4,096	66	4,096	647	4,096	4,096	
CeTRMR_e_C4_Clutc h	553	4,096	4,096	4,096	727	4,096	
CeTRMR_e_C5_Cl utc h	4,096	4,096	4,096	4,096	4,096	727	
CeTRMR_e_C6_Cl utc h	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utc h	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)
X Unit: Possible Output Tie-up Combination (unitless)
Y Units: Clutch

y/x	CeTCLR_e_TUM_Out Lockl	CeTCLR_e_TUM_Out Lock2	CeTCLR_e_TUM_Out Lock3	CeTCLR_e_TUM_Out Lock4	CeTCLR_e_TUM_Out Lock5	CeTCLR_e_TUM_Out Lock6	CeTCLR_e_TUM_Out Lock7
CeTRMR_e_C1_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - Illegal Drive Clutch Combinations

Description: All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

Description: All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Park-Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Me	CeTRMR_e_IllegalPN_1Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	1	
CeTRMR_e_C4_Clutch	1	1	0	1	
CeTRMR_e_C5_Clutch	1	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10
CeTRMR_e_C1_Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0723 (MY21) transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
seconds

y/x	-40	0	40
1	5	3	1

Initial Supporting table - P0723 Wheel Speed Calc

Description:

y/x	400	500	600	700	800
1	300	375	450	525	600

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

Description: Primary Oncoming Clutch Capacity Offset from return spring pressure

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	150	50	50	50	50	150

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
XUnit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
XUnit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean
X Unit: Gear
Y Units: Clutch

Ratio Monitor Clutch States - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1

Ratio Monitor Clutch States - Part 2

y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0

Ratio Monitor Clutch States - Part 3

y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1

Ratio Monitor Clutch States - Part 4

y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supporting table - Ratio Monitor Clutch States					
CeTSER_e_C6_Clutch	1	1	1	1	

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate

Value Units: Percent Increment Per Loop
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold

Description: Threshold slip value below which the clutch is considered holding

Value Units: clutch slip (RPM)
X Unit: Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph)
X Unit: Transfer Case Range
Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	54	20
CeTGRR_e_Gear2	85	31
CeTGRR_e_Gear3	118	44
CeTGRR_e_Gear4	142	52
CeTGRR_e_Gear5	164	61
CeTGRR_e_Gear6	193	72
CeTGRR_e_Gear7	243	90
CeTGRR_e_Gear8	286	106
CeTGRR_e_Gear9	354	131
CeTGRR_e_Gear10	386	143

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - 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	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0